September 8, 1947

# STEEL

*The Magazine of Metalworking and Metalproducing*

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 37

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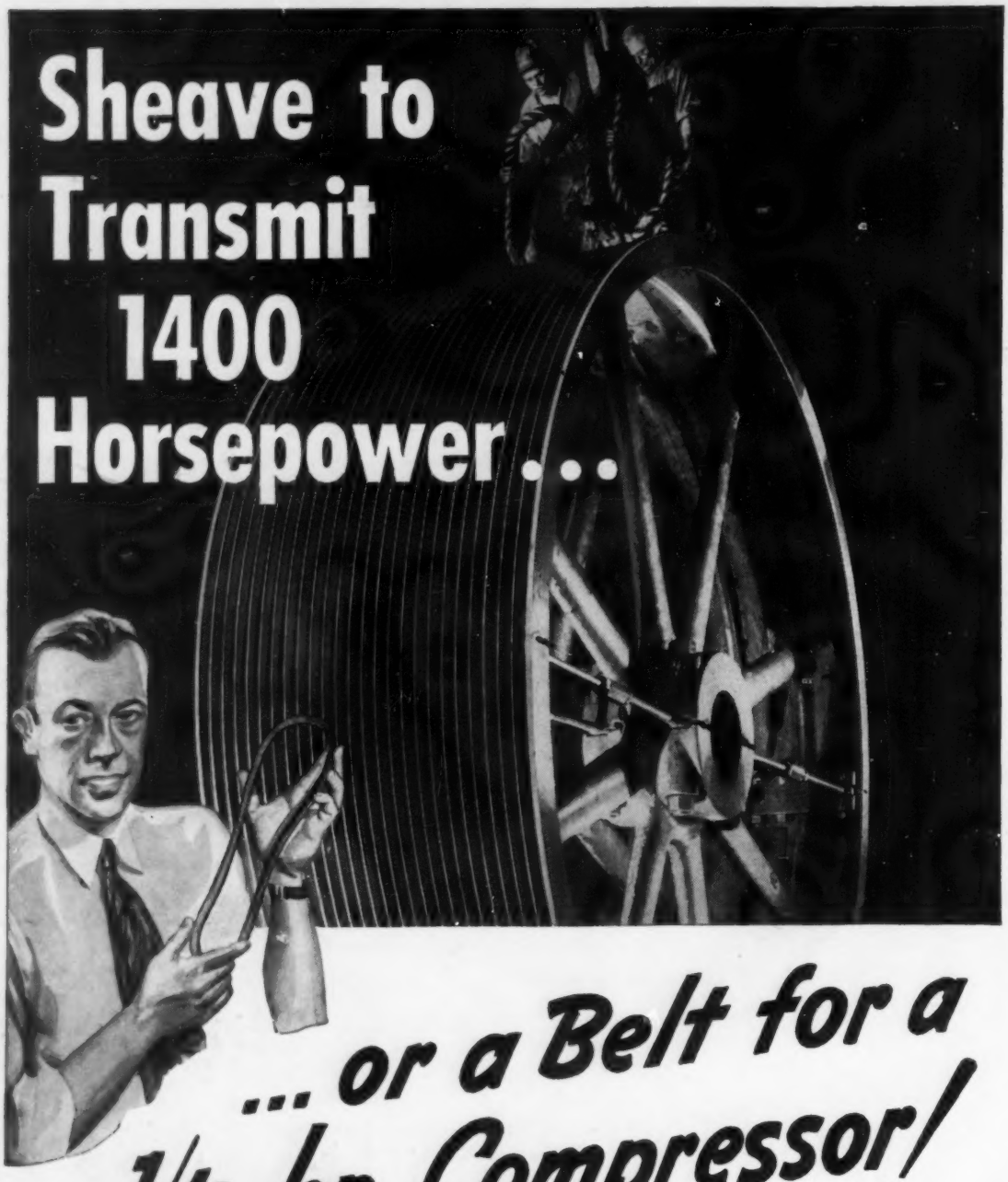
DETROIT

WORTH

STEEL PLATES-FLANGED AND DISHED HEADS

WORTH STEEL COMPANY
CLAYMONT, DELAWARE

# Sheave to Transmit 1400 Horsepower...



# ...or a Belt for a 1/4 hp Compressor!

CALL ON THE TEXROPE LINE for the *best* in V-belt engineering and V-belt equipment. That has been true for 22 years — ever since Allis-Chalmers originated the Multiple V-belt drive for industry.

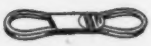
Back of every *Texrope* installation — from fractional horse power V-belts that manufacturers put on washers, air-compressors or water systems—to the biggest V-belt drives ever designed and successfully applied—stands the finest V-belt engineering talent in the world.

There's no substitute for this vast experience and tremendous fund of knowledge. It is reflected in every *Texrope* product.

What do *you* need... a few V-belts and sheaves — or a daring new application of the multiple V-belt principle? Call on the *Texrope* line! Equipment and engineering help are as close as your nearest A-C sales office or dealer. ALLIS-CHALMERS, MILWAUKEE.

A 2187

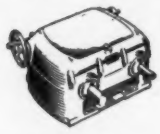
## TEXROPE ..Greatest Name in V-Belt Drives



**"Super 7" V-BELTS**
Five Types — Sizes to suit every power transmission job.

**Texsteel, Texdrive, "Magic-Grip"**
— sheaves in a full range of sizes, grooves.

**"Vari-Pitch" SHEAVES**
Exact variations in speed, stationery or motion control.



**SPEED CHANGERS**
Speed variations up to 375% at the turn of a crank.

**ENGINEERING**
Finest V-Belt engineering talent in the world—at your call.

---

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

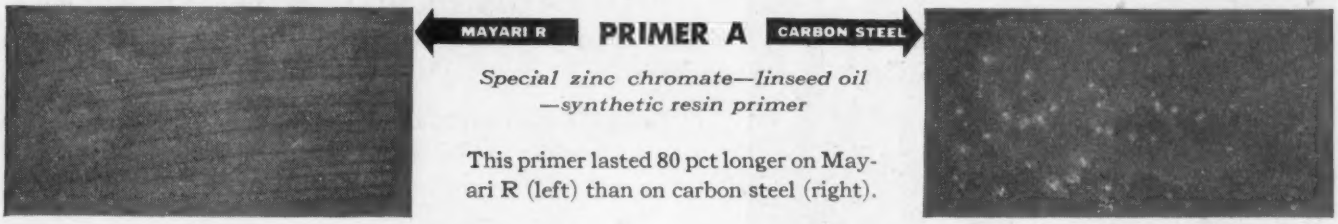
# ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

# Tests show MAYARI R holds paint 20% to 80% longer

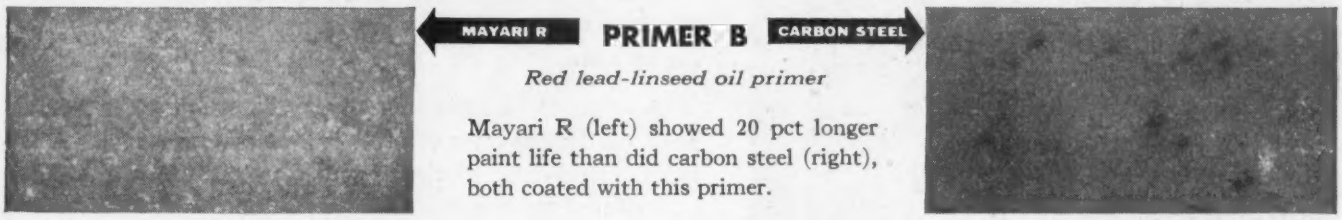
On December 22, 1944 a test was started to determine the relative paint adherence of Mayari R steel and ordinary carbon steel. Five specimens of each of these steels in 4-in. by 4-in. by ¼-in. angle sections with typical partly rusted scale surfaces were wire brushed and given a coating of each of five different types of primer paint at a uniform dry film thickness of 2.5 mils. These painted sections were then placed at a 45-degree angle in a corrosive industrial atmosphere. After exposure under identical conditions for the same period of time, adherence results were as shown below.




**PRIMER A**

*Special zinc chromate—linseed oil —synthetic resin primer*

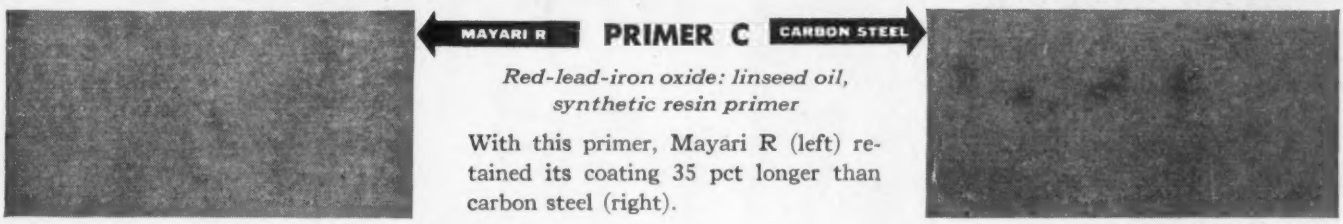
This primer lasted 80 pct longer on Mayari R (left) than on carbon steel (right).




**PRIMER B**

*Red lead-linseed oil primer*

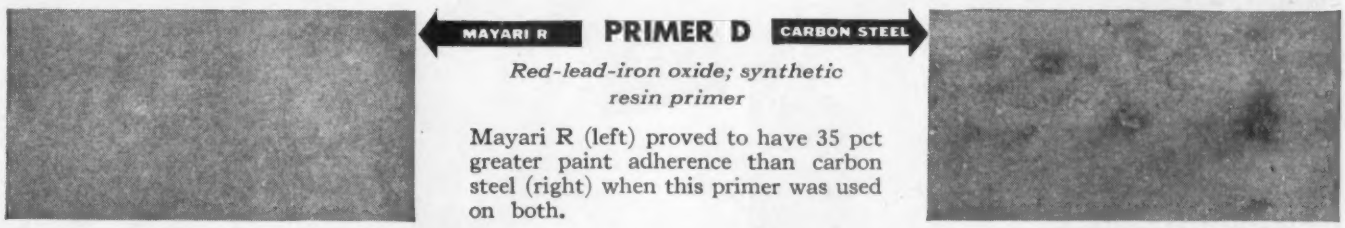
Mayari R (left) showed 20 pct longer paint life than did carbon steel (right), both coated with this primer.




**PRIMER C**

*Red-lead-iron oxide: linseed oil, synthetic resin primer*

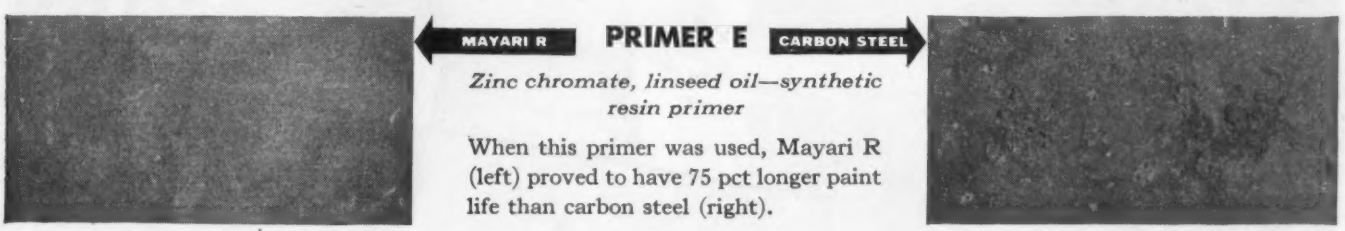
With this primer, Mayari R (left) retained its coating 35 pct longer than carbon steel (right).




**PRIMER D**

*Red-lead-iron oxide; synthetic resin primer*

Mayari R (left) proved to have 35 pct greater paint adherence than carbon steel (right) when this primer was used on both.




**PRIMER E**

*Zinc chromate, linseed oil—synthetic resin primer*

When this primer was used, Mayari R (left) proved to have 75 pct longer paint life than carbon steel (right).

This research investigation, confirmed by the experience of Mayari R users in many industrial applications, shows how important savings in paint and labor are made possible through the use of Mayari R low-alloy, high-tensile, corrosion-resisting steel.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

*On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation*
*Export Distributor: Bethlehem Steel Export Corporation*

# WHAT IS OPERATOR CONTROL?

**OPERATOR CONTROL** means gradual or instantaneous starting and stopping.

**OPERATOR CONTROL MEANS ACCURACY** because it permits smooth lowering and lifting as slowly or as rapidly as desired.

**OPERATOR CONTROL MEANS SAFETY,** because it helps prevent accidents that might otherwise occur in jerky lowering and hoisting, or in hand lifting.

**OPERATOR CONTROL MEANS ECONOMY** because it eliminates motion wasted in operating chain blocks, or lifting by hand.

In addition to Operator Control, Ingersoll-Rand Overhead Air Hoists offer other time and money saving advantages . . . increased efficiency and output . . . tested durability . . . reduced maintenance and operation costs . . . minimum operator fatigue.

Our experienced hoist engineers will be glad to help you solve your hoist problems. Phone our nearest branch office or write for Bulletin 5020.

**Ingersoll-Rand**

11 Broadway, New York 4, N. Y.

66-8

COMPRESSORS · AIR TOOLS · ROCK DRILLS · TURBO BLOWERS · CONDENSERS · CENTRIFUGAL PUMPS · OIL AND GAS ENGINES

# How rubber prevented a squawkie talkie

## *A typical example of B. F. Goodrich product development*

TELEPHONE company engineers wanted to make it possible for you to call from your car as quickly and conveniently as from your living room. But they had to figure out what to do about shock and vibration. Constant jarring and vibration would distort voices so they couldn't be understood.

That's when the engineers called on B. F. Goodrich to see if their problem could be solved with rubber. It could — and was. The telephone transmitter was mounted on B. F. Goodrich Vibro-Insulators and worked perfectly — no shock, no vibration, no noise.

B. F. Goodrich Vibro-Insulators have been used for years to support even heavy machines as if they are hanging or floating *on rubber.* In factories they keep vibration from passing through floors and walls. Hundreds of thousands of them have been used in delicate electronic devices to prevent vibration and shock from getting inside and causing harm.

Now mobile telephones are in production and Vibro-Insulators are playing an important part in their success — another example of the progress made possible by the never-ending research and constant product improvement at B. F. Goodrich. *The B.F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

Vibro-Insulators— Trade Mark, Reg. U. S. Pat. Off.

**B.F. Goodrich**

**FIRST IN RUBBER**

# Behind the Scenes...

## Between-Times

This is one of those in-between periods which come to the publishers of any and all periodicals. The big Machine Tool Show issue is all closed up and gone, but we're writing this before it is actually mailed to all you good people, and we don't know yet what sort of a noise it will make. Wish we could use some of the glowing reports we know will be coming in over the next few days, but since we can't, we'll just have to hold our breath and try to fill up this space in some other inoffensive manner.

## Impossible Puzzle

One thing we do want to do this week is run a puzzle which our experts claim is impossible of solution, so you fiends among our reading public can prove them wrong, or maybe even right. Seems there was a small army outpost housed in a lonely building far from civilization. This building was just big enough for the two men stationed there, being ten feet square on its base and ten feet high. In order that supply planes could locate it, the inmates erected a 100-foot flagpole, fastening it to the building. One night a high wind broke the flagpole part way up. The broken piece remained fastened at the top, and fell in such a way that it just touched the roof of the shack on the opposite side, and the tip of the flagpole just touched the ground. The question is: How high up did the flagpole break?

## News of a Puzzler

One of the boys who will be especially interested in this problem will be our No. 1 puzzle answerer, Reid Jones. Reid wrote in the other day that he's having plenty of time on his hands these days, having been removed from his haunts in St. Louis to the Glockner Sanitarium, Colorado Springs, Colo., while he fights a few bugs. If any of you puzzlers have some tough ones you'd like to send along, we know Reid would be happy to sweat out a solution.

## Orchids to Us, & Thanks!

We've been talking around here for some time about the newspaper clipping figures compiled for us by a prominent national clipping service on the amount of newspaper space used in quoting business papers. Needless to say, we found our own efforts topping the list by a safe margin. Other people seem to recognize the fact, too, because we received the other day a bit of promotion sent out by the *Milk Plant Monthly* which starts out like this, "One of the most widely quoted trade papers by the outstanding metropolitan dailies in this country is STEEL. It is considered the Bible of the industry, and newspapers do not quarrel with the facts in it." We didn't ask for that compliment from our esteemed contemporary, but we're happy to have it and pass along our thanks, and best wishes for continued popularity of all milk products.

## Knocking & Gnashing

One of our ex-colleagues, Bill Hammerquist of Electro Manganese Corp., Knoxville, says that in his circles down there they refer to that other city as Gnashville, not Knashville, as our character stated here a couple of weeks ago. Being far removed from the scene, we are probably safe in saying that the Nashville folks undoubtedly refer to their sister city as Knocksville!

## Scouting the Trout

One of the things we do occasionally in this column is talk about the excellent job done by the people who advertise their products in STEEL. We're going to stray a little off the beam right now, though, and read you a piece of copy which came to us from one of the local sea food houses and which has us practically drooling. They're trying to sell us some trout, which they like to call the "glamor fish." The copy goes on to say, "Our Scouts are always on the alert visiting Canada's remote virgin streams and lakes, in order that we may have live fish almost the year around. Our specialty is Indian caught Hook and Line Trout. They are always firmer and sweeter . . ." What we're wondering now is just how you go about getting a job as a trout scout.

## Ads All Tooled Up

In the ads, while we're speaking of them, in the Machine Tool issue last week we noted a number of people who had photographs of models of their booths featured. That seemed like a smart idea to us, because in looking over those models we felt a strong urge to see the real thing in action, with all those tools operating. In passing, of course, we couldn't overlook the announcement of a plant tour, in a new and different way, in the "Separate" machine tool show being staged by the DoAll Co., at its plant in nearby Des Plaines, tickets available at the company's booth in Chicago.

Shrdlu

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STEEL

Vol. 121—No. 10 September 8, 1947

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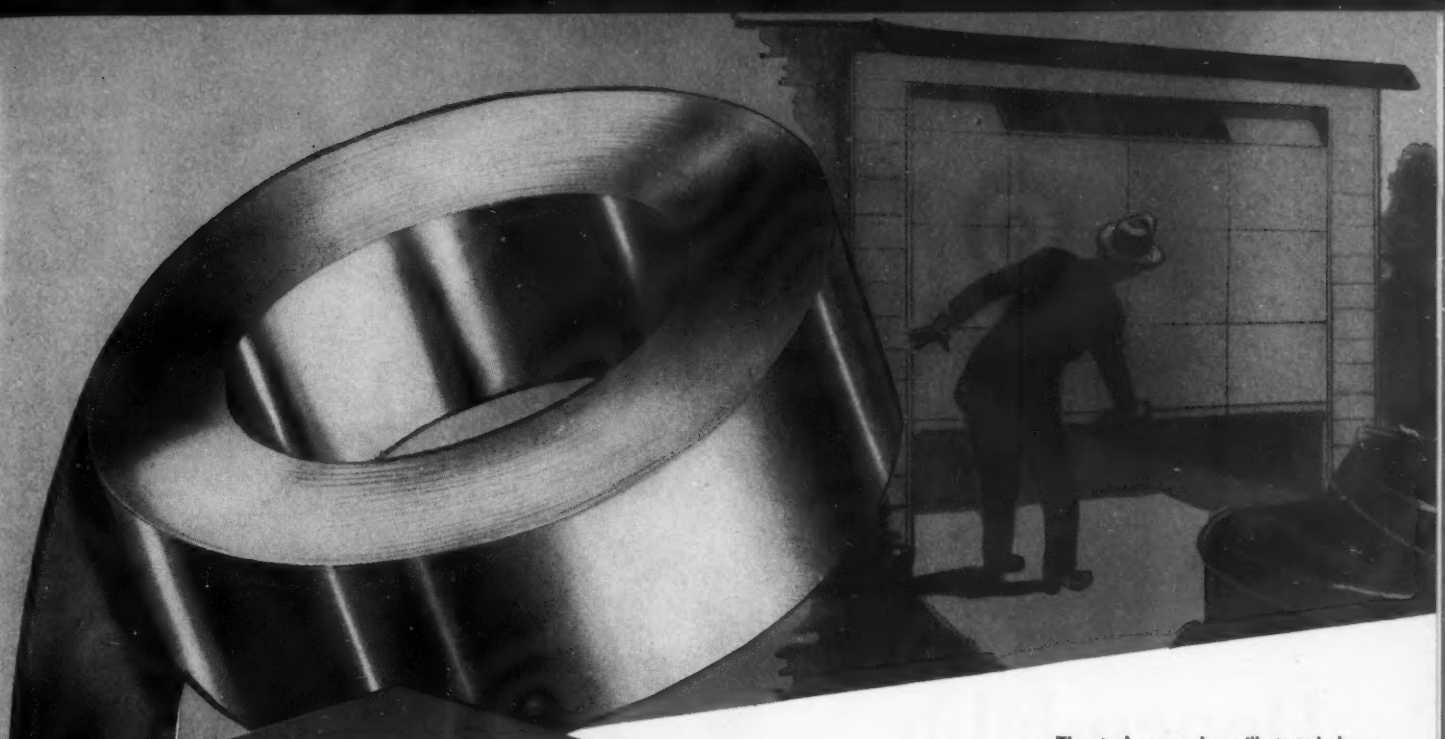
*Editorial Staff on Contents Page*



SHARONSTEEL

* The steel garage doors illustrated above, built to withstand severe weather conditions, are made from Galvanite-coated Sharonsteel, painted before installation.

# GALVANITE*

## Weatherproofed Strip Steel

Galvanite* is a patented Sharonsteel, weatherproofed with a special zinc coating that provides *real rust protection.*

Fabricators using Galvanite-coated Sharonsteel enjoy these advantages:

1. Galvanite is ideal for deep drawing and forming.
2. Galvanite's coating does not peel, flake or powder after difficult fabrication.
3. Galvanite's dry "toothy" surface makes paint or enamel spread easier and last longer.
4. Galvanite is furnished in long coils, or in cut lengths, packaged on blocks or skids for economical handling.
5. Galvanite eliminates inventory loss due to rust.

**SHARON STEEL CORPORATION**

*Sharon, Pennsylvania*

**PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT TUBE AND STEEL COMPANY, DETROIT, MICHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO.** Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated Products — Cooperage Hoop — Detroit Seamless Steel Tubing — Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications—Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Steel Strip — Steel Strapping, Tools and Accessories.

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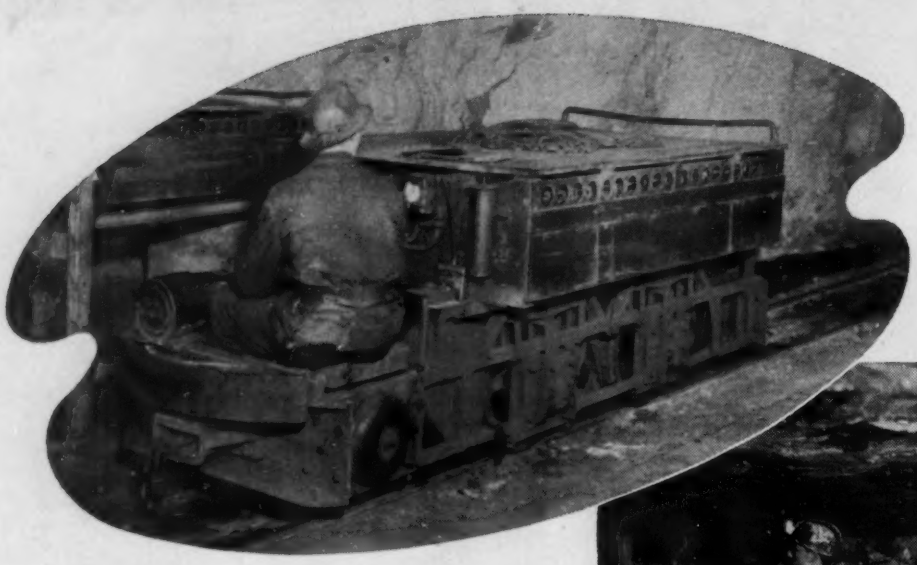
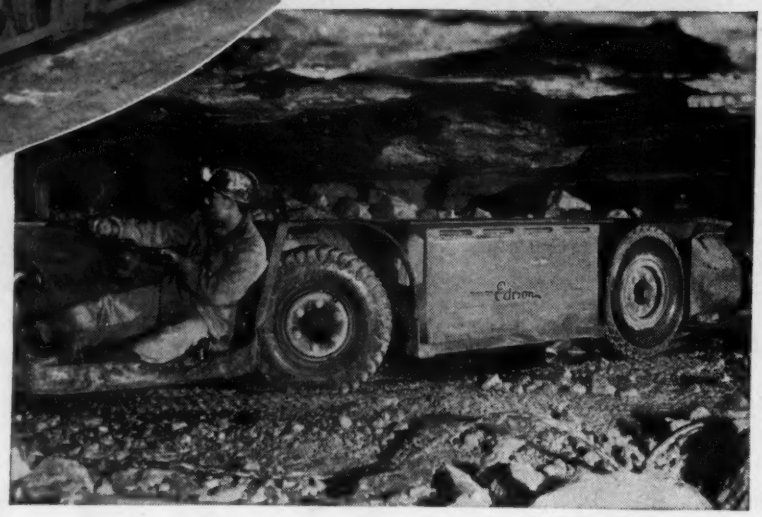




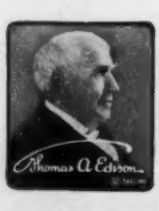
# Dependable Power

## *for* Mine Locomotive *or* Shuttle-car ~

*In Mine Locomotives and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages*

- They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- They are **foolproof electrically**; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- They can **stand idle indefinitely** without injury, without attention, and without expense.
- They are **simple and easy to maintain.**

WHEN IT COMES to standing up in mine haulage service—on locomotives or shuttle cars—EDISON Nickel-Iron-Alkaline Batteries have no equal for rugged strength and dependability. As a result, they give the closest approach to failure-free, uninterrupted haulage power it is possible to obtain, and give longer service life than other types of batteries. The reasons are few and simple: steel cell construction that withstands rough, hard usage; an alkaline electrolyte that is a preservative of steel; and an electrochemical principle of operation that is free from self-destructive reactions. Because they stay on the job and out of the repair shop, nickel-iron-alkaline batteries help cut haulage costs. *Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Company, Ltd., Montreal and Toronto.*




**EDISON**

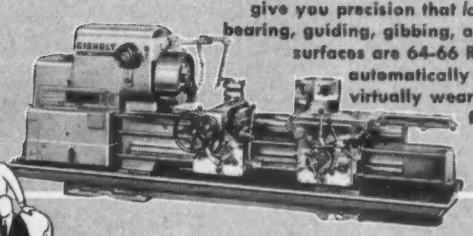
***Nickel • Iron • Alkaline***

**STORAGE BATTERIES**

# GISHOLT'S

# Hardened steel bed ways are one of the greatest contributions ever made to precision machining on a turret lathe

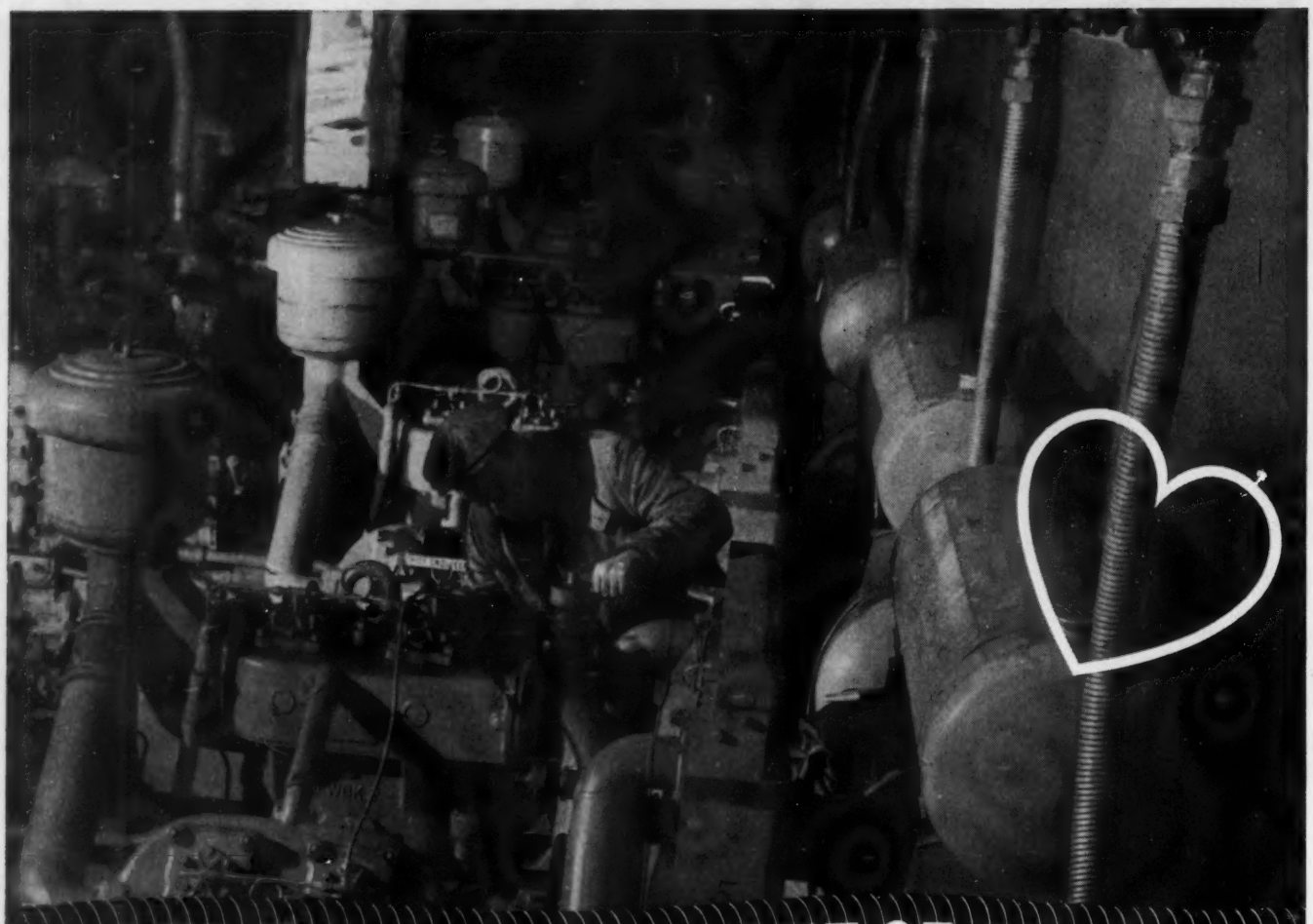
**GISHOLT TURRET LATHE**
give you precision that *lasts! All* loa
bearing, guiding, gibbing, and clampir
surfaces are 64-66 Rockwell C-
automatically lubricated-
virtually wear-proof. Wri
for literatur



**GISHOLT MACHINE COMPANY,** *Madison 3, Wisconsin*

**THE GISHOLT ROUND TABLE**
represents the collective experience
of specialists in the machining,
surface-finishing, and balancing
of round and partly round parts.
Your problems are welcomed here.

**turret lathes • automatic lathes • superfinishers • balancers • special machines**



# TAKES THE "SHAKES" OUT OF AIR LINES

**Penflex Flexible Metallic Hose prevents vibrations on compressed air lines, easily... safely... economically**

With a mighty roar, 15 diesel-powered air compressors pump a steady air supply for air tools and equipment used on a world-known project. During the installation of these powerful compressor units, a method was required to prevent constant vibration from being transmitted to the rigid air lines.

That's where Penflex "Flexineering" service paid off. By using 3" Penflex interlocked flexible metal hose as connectors between compressors and pipe lines, the "shakes" are eliminated. Tight as a pipe, but flexible, Penflex hose "soaks up" constant vibration, assuring smooth air power . . . leak-proof, low-cost service. Penflex hose is also used to carry off obnoxious diesel exhaust, preventing dangerous leaks and vibration.

When your plant is troubled with flexible tubing problems, whether they pertain to production, maintenance or high operating costs, let Penflex "Flexineering" find the right answer. As America's oldest manufacturer of flexible hose, Penflex offers helpful layout-design service on flexible tubing applications to all industries. For flexible metallic hose, tubing, or couplings from 1/8" I.D. and up . . . for handy, time-saving automatic barrel fillers and pneumatic rivet passers . . . for the finest in engineering service, call on Penflex. Write today, to . . .

**PENFLEX SALES COMPANY**

*Division of*

PENNSYLVANIA FLEXIBLE METALLIC TUBING COMPANY

7219 Powers Lane — Philadelphia 42, Pa.

BRANCH SALES OFFICES—BOSTON • NEW YORK • SYRACUSE • CLEVELAND • CHICAGO • HOUSTON • LOS ANGELES

*Penflex*... HEART OF INDUSTRY'S LIFE LINES

Copyright 1947—Penflex Sales Co.

# When designs call for STEEL of

**UNIFORM HARDNESS**

**HIGH FATIGUE LIFE**

**FINE SURFACE**

**ACCURATE SIZE**

## *specify* SANDVIK

Sandvik Quality Steels have established their reputation the hard way — on applications where physical demands are extra severe.

Cold-rolled Sandvik specialty steels are supplied in annealed, unannealed and hardened and tempered conditions. For twenty-six years they have successfully met the requirements of an increasingly wide variety of exacting special purposes.

When your design calls for steel of uniform hardness, high fatigue life, fine surface, accurate size, call us.

Phone or write for stock lists, quotations or further information.

SS-14

SANDVIK *Quality* STEELS

**SANDVIK STEEL, INC.**

**111 Eighth Avenue, New York 11, N. Y., WAtkins 9-7180**
180 N. Michigan Ave., Chicago 1, Ill., FRAnklin 1745
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***WAREHOUSES: New York and Cleveland***

# In Any V-Belt Only the SIDES Touch the Pulley

## The Sides Do ALL the GRIPPING

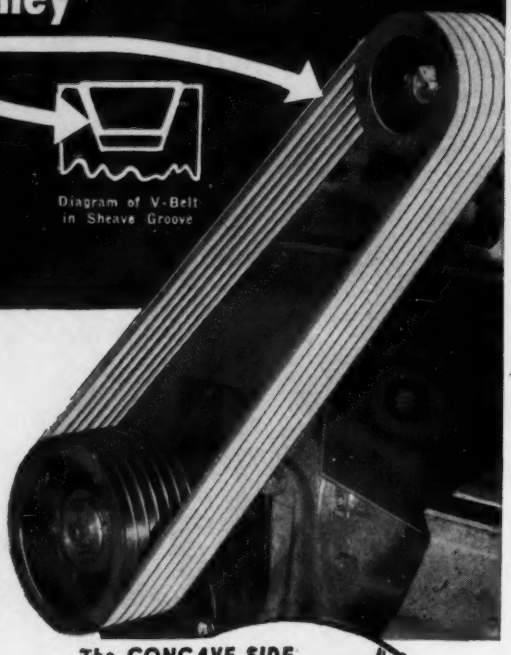


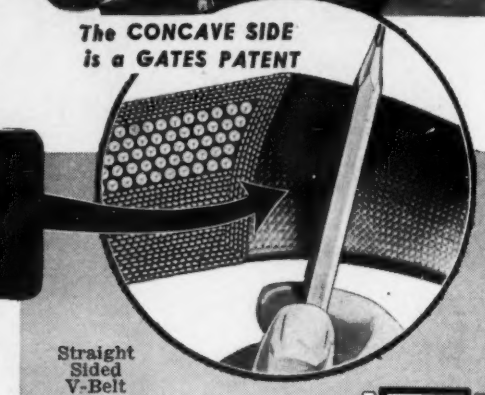
Diagram of V-Belt in Sheave Groove

## — Naturally, It's the SIDES that GET the WEAR!

The moment you look at a V-belt in its sheave, you see that the *sides* do all the *gripping*—They get *all the wear* against the sheave groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides alone—take hold of the driven pulley and deliver the power to it.

This simple fact explains why you have always noticed that the *sidewall* of the *ordinary* V-Belt is the part that *wears out first.*

## ★Now See How the *Patented* CONCAVE SIDE *REDUCES Sidewall Wear - Lengthens Belt Life!*



*The CONCAVE SIDE is a GATES PATENT*

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt. The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

Straight Sided V-Belt

Fig. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

Fig. 1-A

**You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.**

Fig. 2

Gates V-Belt with Patented Concave Sidewall

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley.

Fig. 2-A

**No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!**

## ★More Important *NOW* That Gates SUPER V-Belts are Available

Now that Gates *Specialized* Research has resulted in Super V-Belts capable of carrying much heavier loads—up to 40% *higher horsepower ratings* in some cases—the sidewall of the belt is called upon to do even *more work* in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important NOW than ever before!

**THE GATES RUBBER COMPANY DENVER, U. S. A.**

*"World's Largest Maker of V-Belts"*

478

# GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

Gates

THE MARK OF SPECIALIZED RESEARCH

# GET *Quality Control* AND *Save* UP TO 65% OF FINISHING COSTS!

## ELECTROSTATIC SPRAY PAINTING

- **SAVES COATING MATERIAL**
  Normally 40% to 50%... sometimes more! Used with commercially available finishes.
- **SAVES LABOR**
  Fully automatic . . . requires only one attendant. Booth clean-up reduced as much as 90%.
- **ASSURES QUALITY FINISH**
  A consistently uniform finish . . . with fewer rejects . . . at any production speed.
- **INCREASES PRODUCTION**
  Constant production . . . more efficient operation, supervision and inspection.
- **SAVES FLOOR SPACE**
  A compact Ransburg unit often replaces several spray booths.
- **SAVES OVERHEAD**
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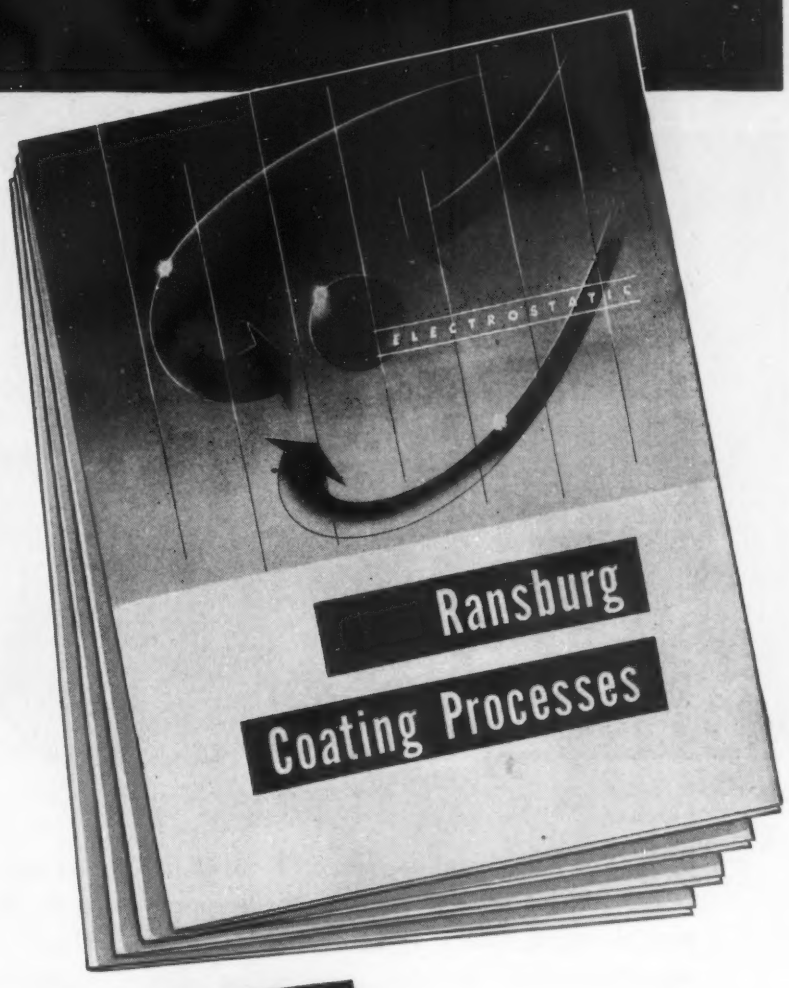
**RANSBURG**
*Electrostatic*
**PAINTING PROCESSES**

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*for this new Ransburg Booklet*

**RESULTS TELL THE STORY!** In this new booklet you'll see *why* Ransburg has accomplished tremendous economies in finishing, with *automatic* quality control . . . *all* so important to manufacturers today. Pictured here are *amazing results Ransburg has obtained on a wide variety of products.*

RANSBURG *can simulate your production facilities* in their laboratories . . . and prove the applicability of Electrostatic Spray-Painting to your requirements. *Your request* to see these finishing economies demonstrated will receive every consideration . . . *without obligation.*

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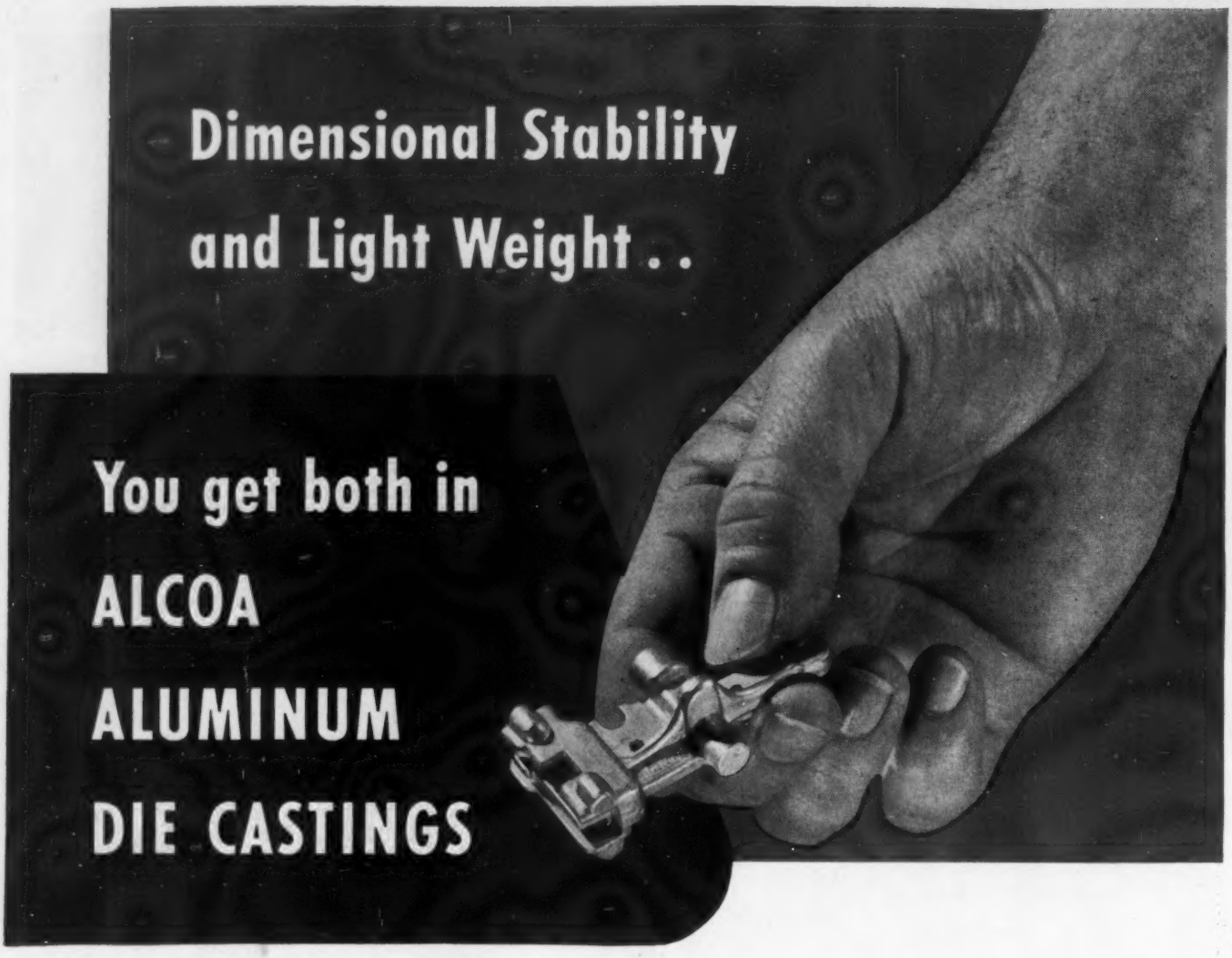


This precision part is die cast to close tolerances, and the critical dimensions machined to limits of ±0.0005″ by the manufacturer. Because aluminum die castings have high dimensional stability, the part *stays* inside those limits *after* machining and assembly.

Dimensional stability and light weight are but two of the properties of Alcoa Aluminum Die Castings. They don't creep under sustained stress. They keep their strength at below-freezing temperatures. Maintain their dimensional stability at baking-oven temperatures. Have excellent surfaces that will take paint and other finishes without pretreatment.

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*For flat springs and small stamped parts, Wallace Barnes also processes in its own mill many tempers and hardnesses of spring steel to meet requirements of intricacy or endurance.*

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SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

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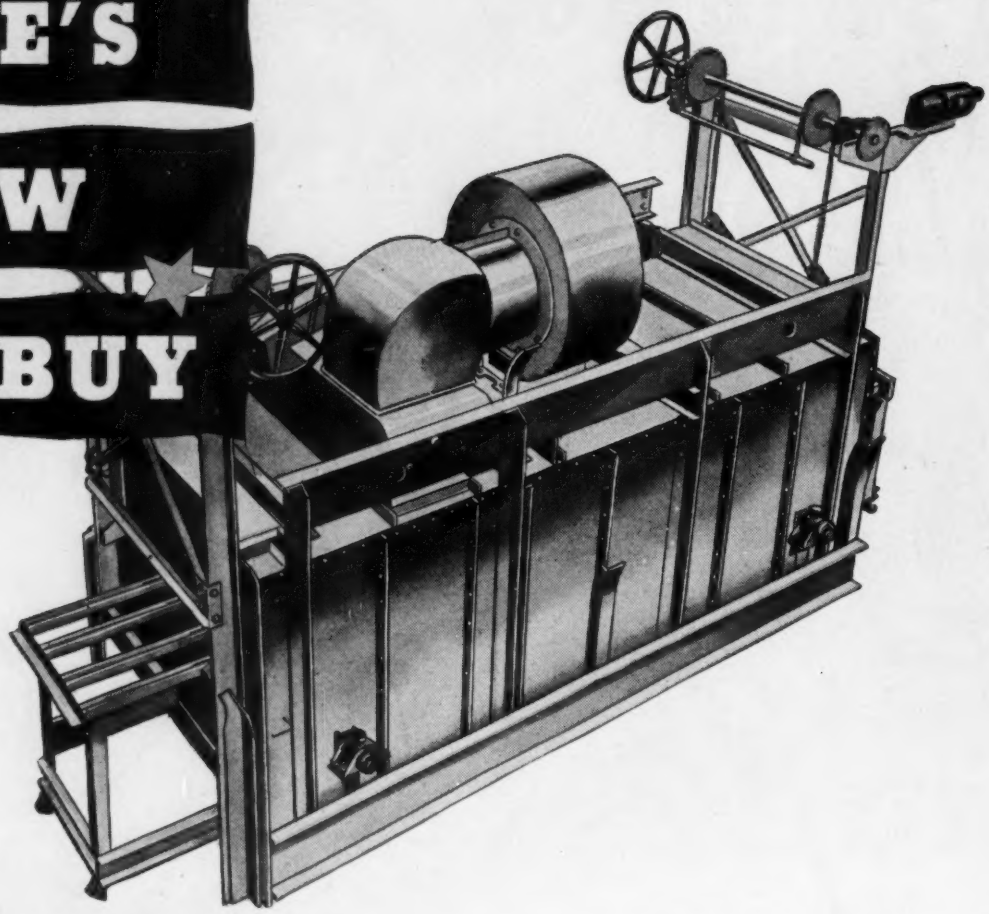

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A great many types of this highly specialized equipment are located throughout the country. All you need do to locate the particular Furnace or Oven for your specific job, is to fill out the specification sheet in the back of the new WAA booklet. If you have not already received a copy of this booklet, one will be mailed you upon request. Return the specification sheet to the War Assets Administration in Washington. WAA does the rest—and will arrange for inspection of the equipment before purchase.

**This booklet is designed to aid you in selecting the type of Furnace or Oven you need; it shows you how to prepare submission of your exact specifications.**

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***Industrial Furnaces and Ovens are available for your overseas customers. Act now to fill their requirements.***

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# TEETH are TOUGH BACKS are STRONG

## When your Hack Saw Blades are made of these Ingersoll Hack Saw Steels

ENGINEERING B-W PRODUCTION

Whenever you order hack saw blades from your regular hack saw blade maker, be sure to get blades with tough teeth and strong backs. Whichever type you prefer, you'll find that INGERSOLL "18-4-1" and INGERSOLL D-B-L Steels give you blades with tougher cutting edges, higher impact resistance and relative freedom from decarburization.

So for tough blades that give a smooth, easy cut, take advantage of Ingersoll's lifelong research in special steels! Specify hack saw blades made of INGERSOLL "18-4-1" or INGERSOLL D-B-L Hack Saw Steel.

*Furnished in INGERSOLL D-B-L "5-4" and INGERSOLL D-B-L 2, "6-5"

**INGERSOLL *Steel Division***

**BORG-WARNER CORPORATION • NEW CASTLE, INDIANA**

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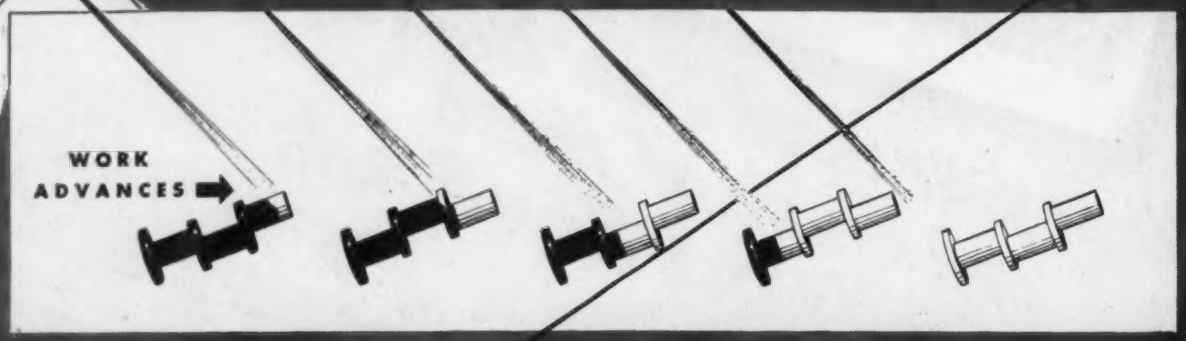



## Pangborn "Shot Peening" GIVES YOU YOUR CHOICE OF 5 WAYS TO IMPROVE PRODUCTION OR PERFORMANCE

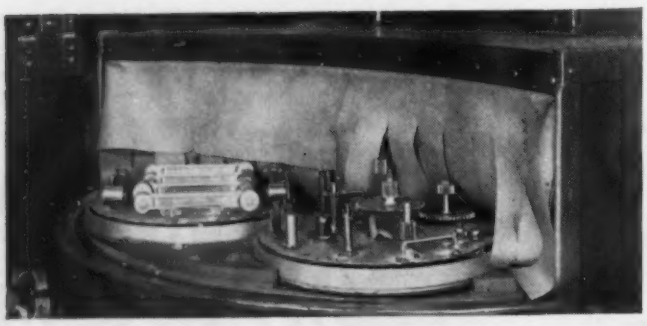
High-velocity hammering of metal surfaces with round shot ("peening") is a fast-growing method of increasing fatigue resistance. It puts the surface metal under residual compression and the metal beneath under tension; subsequent flexing merely *relieves* the compression and tension.

Resistance to deformation and fracture is increased often as much as 500%.

The benefits of shot peening can be put to any of the following advantages —

***1.** longer service life . . . **2.** higher stressing of parts . . . **3.** reduction in size and weight . . . **4.** use of less expensive materials . . . **5.** elimination or reduction in cost of subsequent operations.*

Pangborn Shot Peening equipment is being used for a great variety of work — from coil springs to crankshafts. A free booklet, "Shot Peening — What It Means to You", describes the application and gives performance data. Write to Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment.* Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.



Pangborn Standard Shot Peening Table, front view. ROTOBLAST* Model impels shot by centrifugal force, AIR BLAST Model by compressed air.

*Trademark of the Pangborn Corporation

**Pangborn**

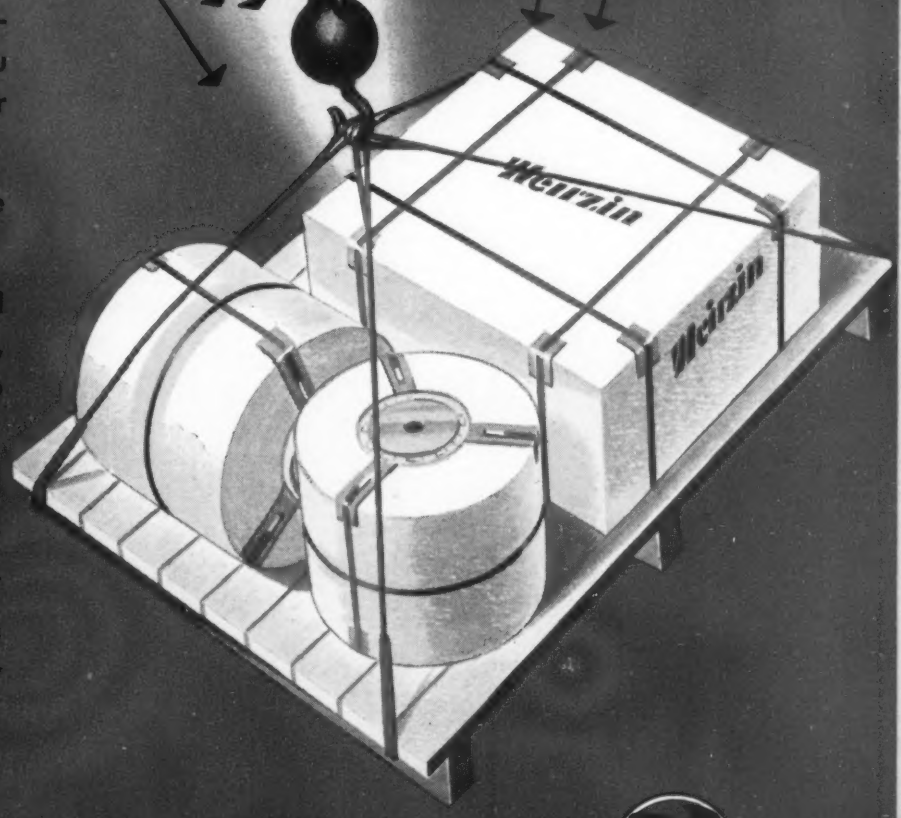
Pangborn Corporation, Hagerstown, Maryland

**BLAST PEENS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB**

# your manufacturing costs- GOING DOWN

## Weirzin

*Electrolytic Zinc-Coated Sheets and Strip*




When Weirzin takes the place of ordinary sheets and strip in your plant, you can count on important savings in your manufacturing costs.

**Inventory losses are cut**—because Weirzin will not corrode in storage.

**Many finishing operations are eliminated**—because Weirzin requires no pickling, cleaning or buffing before fabrication, no prime coat before painting.

**Die maintenance costs are reduced**—because Weirzin's tight zinc coating lubricates dies without danger of zinc deposits.

Add to these economies the advantages of a better-finished product, protected for life against underfilm corrosion, and you realize what Weirzin can do for you. Complete information on request.

**WEIRTON STEEL CO.**

WEIRTON, W. VA. *Sales Offices in Principal Cities*

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WEIRTON STEEL COMPANY

NATIONAL STEEL

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# Then a LORAIN will pay its way plus a *Profit*

HOW many of the items listed are you handling the "strong arm" way or with the aid of some mechanical makeshift?

One Lorain crane, using such attachments as hook, sling, grapple, clamshell or dragline bucket, electric magnet will handle any or all of these jobs at a saving in time and money—and release valuable manpower for other work. It will go anywhere, do anything and is a tireless worker whose efficiency never varies around the clock.

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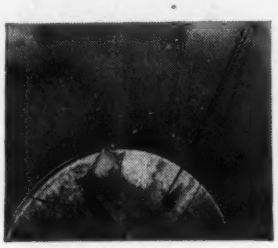
# Go "National" for Lead LININGS

## What kind of Sheet Lead Lining do you need to fight acid corrosion?

**1 Our Regular CHEMICAL LEAD?** This is a practically pure lead, substantially free from bismuth and containing a small amount of copper which boosts corrosion resistance and endurance limit. Used long and successfully throughout industry for lining tanks and for covering apparatus exposed to corrosive fumes or acid splash, it is the base lead for acid handling. The other types, like Tellurium Lead or Antimonial Lead, are simply Chemical Lead alloyed with varying quantities of tellurium or antimony to impart extra qualities.



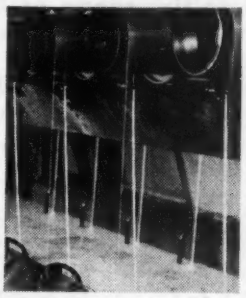
***Lead sheet** is easily formed into any shape and burned to give you one-piece, corrosion-resisting tank linings.*

**2 Our Special TELLURIUM LEAD?** This is Chemical Lead containing a small amount of tellurium. You get all of lead's regular advantages plus certain new ones to meet special service conditions.

One outstanding feature of Tellurium Lead is its increased corrosion resistance at high temperatures.

Another is its ability to work-harden. Mechanical stress, such as bending, stretching or hammering, actually *increases* Tellurium Lead's tensile strength and resistance to fracture.

Tellurium Lead is especially recommended where you have to combat *both* stress and corrosion.



***Tellurium Lead** stands up under vibration or fatigue stresses. That's why it was used here as a protective covering on rayon spinning machines.*

**3 Our Extra-Strong ANTIMONIAL LEAD?** This is made from either Chemical or Tellurium Lead by adding small amounts of antimony to secure greater tensile and mechanical strength. For example, lead containing 6% antimony has a tensile strength almost twice that of Chemical Lead. This, plus its stiffness, makes it suitable for use where mechanical strain is severe or where linings are supported only by a skeleton framework.

Antimonial Lead also is harder and more resistant to abrasion and cutting. It's a good bet wherever erosion or mechanical abuse exists. However, because antimony lowers the melting point, Antimonial Lead is not recommended for use above 240°F.

***6% Antimonial Lead** was used to line these precipitating tanks because it has the extra strength needed to withstand the vacuum used in the operation.*

**No Matter What Your Acid-Handling Problem...**

## Go "National" for Lead

*National Lead is ready to consult with you and supply any type of lead pipe . . . valves . . . sheet . . . lead-lined or lead-covered equipment . . . even complete acid recovery plants. And behind every National Lead product, every National Lead recommendation, are years of experience and many important installations in every field handling corrosive liquids and gases.*

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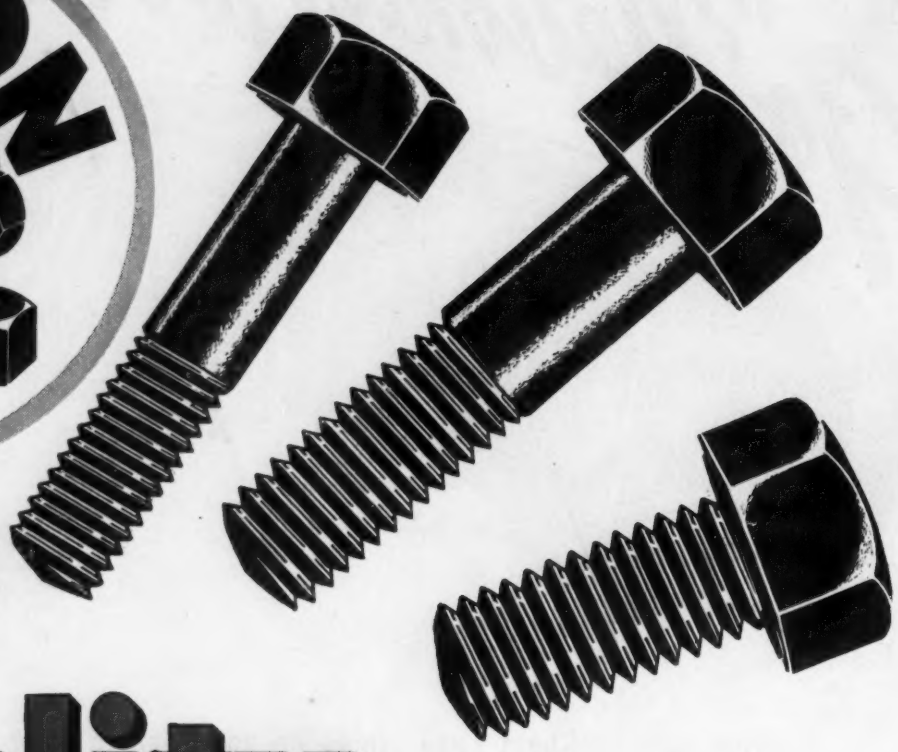
*Offices and Plants in Principal Cities and Canada*



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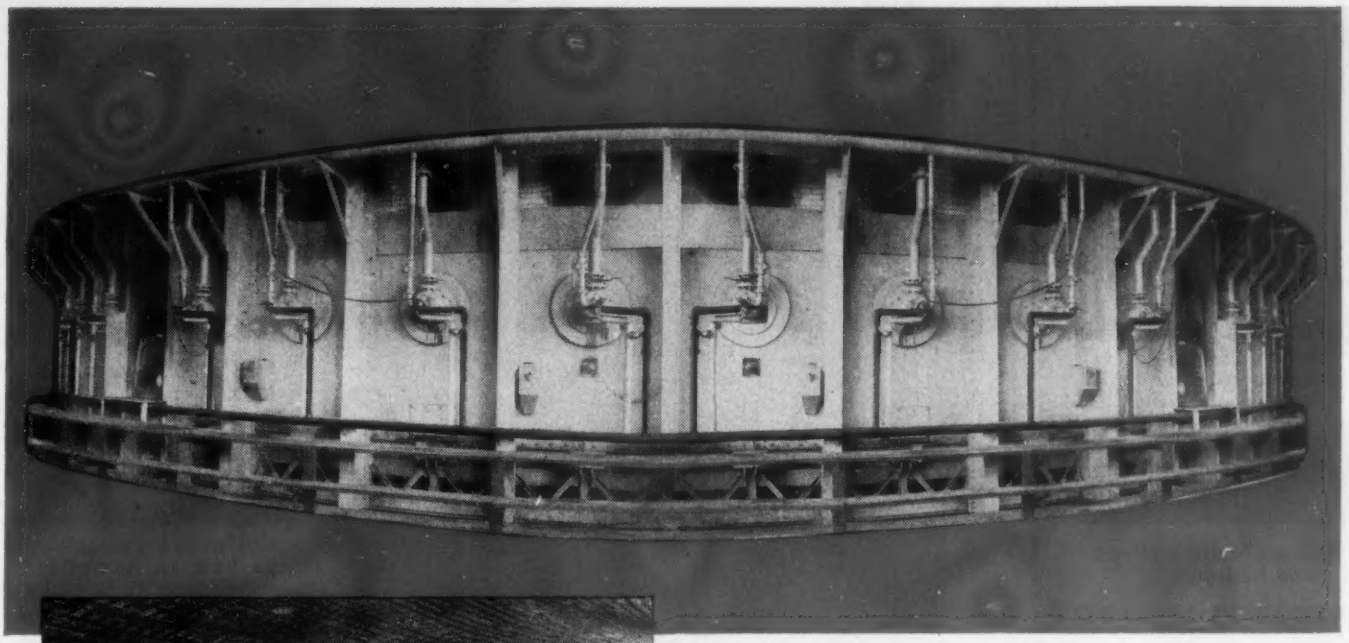
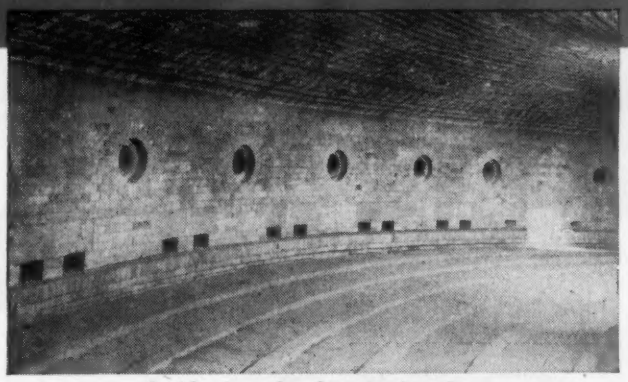
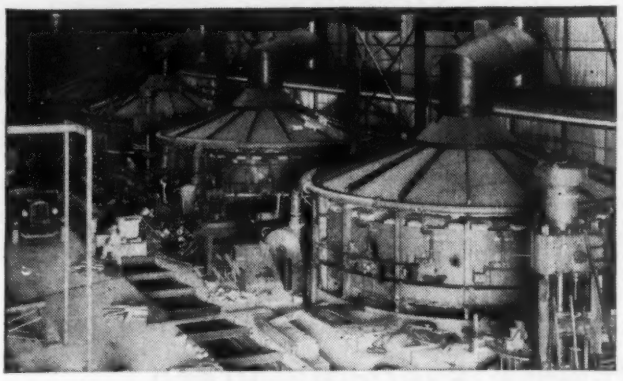




*Inside view after five years' service.*



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On rotary hearth furnaces, hearth alignment—maintained concentric with the furnace chamber—is an important contributing factor to long life and good performance of the equipment.

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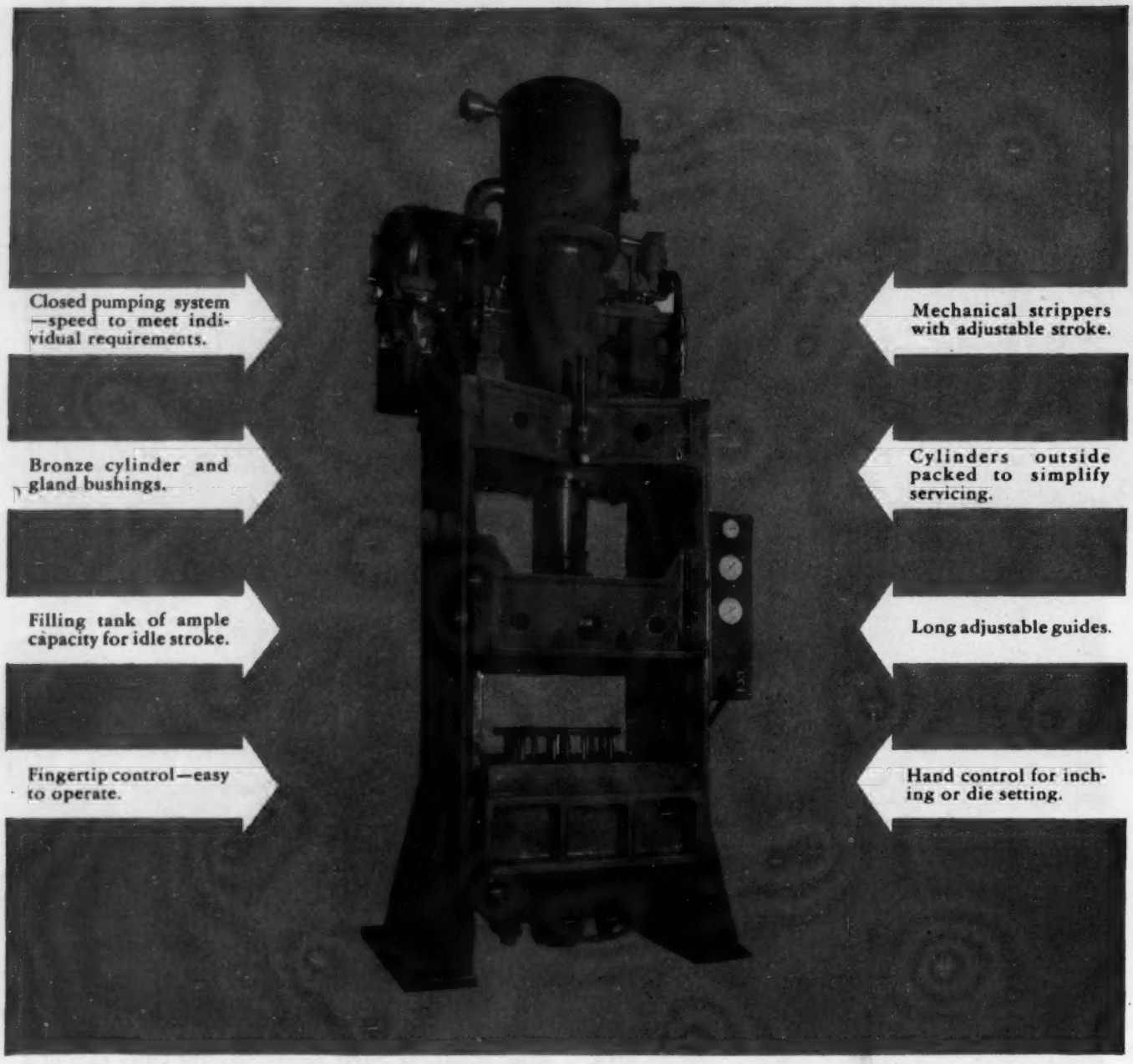
MECHANICAL EQUIPMENT FOR CHARGING AND DISCHARGING MATERIAL FROM FURNACES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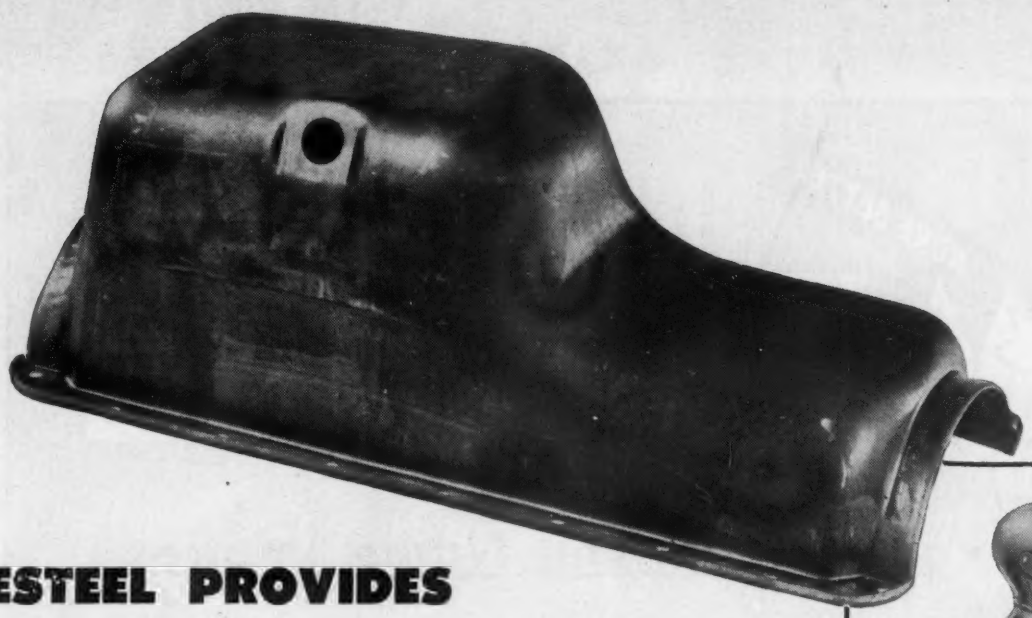

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A large auto manufacturer recently sought a new source of supply for the oil pans illustrated. A supplier had to be found with a high capacity shop — completely equipped for volume production of pans of hot or cold rolled .0625″ steel, 25″ long, 11″ wide and 9″ deep. Presteel was selected because of the wide range of its press and supplementary equipment and its proved ability to turn out huge quantities of large or small precision Stampings.

The entire tooling program was completed in record time. And now Presteel produces these oil pans in volume via a production line setup that simultaneously uses 10 presses, 4 annealing ovens and the necessary conveyors and washing machines. Press equipment used ranges from 50-ton single action to 665-ton double-action—mechanical and hydraulic.

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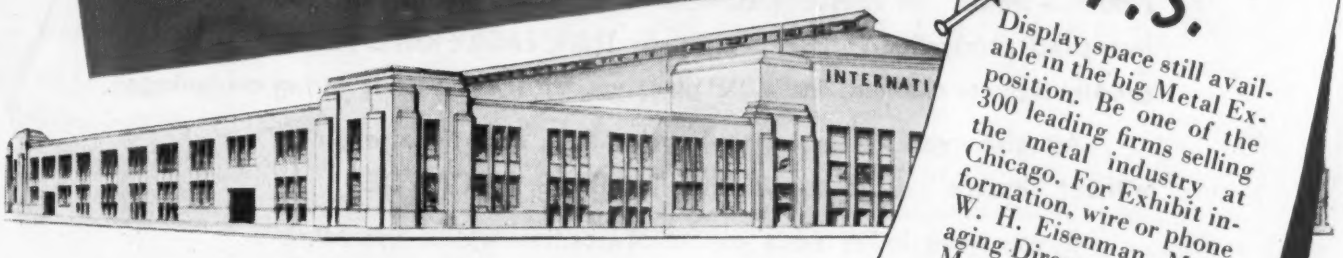

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# SPEED UP out-of-position welds with 3/16"...

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**"AP"**

**CLASS AWS-ASTM-E6010**

**Because of its remarkable versatility, you can use AP size 3/16" in place of 5/32" on all types of joints—in all positions.**

AP is easier to handle . . . it has a fine SPRAY-TYPE ARC. Its DEEP PENETRATION qualities assure strong, lasting bonds and produce X-RAY PERFECT welds. Its unusually LOW SPATTER LOSS means extra footage, increased production. Its exceptionally THIN, EASILY REMOVED SLAG greatly reduces cleaning time. AP gives you all these cost-lowering advantages.

AP also produces good tie-ins and fast, spot penetration without "humps" — it's a PERFECT TACKING ELECTRODE.

If you want lower costs on out-of-position welds, use AP.

***Write for Data Sheet Giving Physical Properties, Applications and Procedures***

**For Industrial Fabrication** —with 3/16" AP it isn't necessary to change electrodes when welding from downhand to vertical or to overhead work. You get fast, sound welds in *any* position.

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**P&H makes a production-proved electrode for every welding requirement: for all mild, alloy and stainless steel applications, cast iron and for building up and hard surfacing.**

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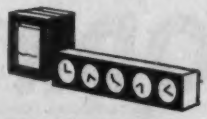
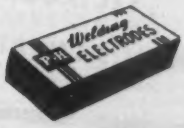


WELDING PRODUCTION CONTROL SYSTEMS

ELECTRIC HOISTS

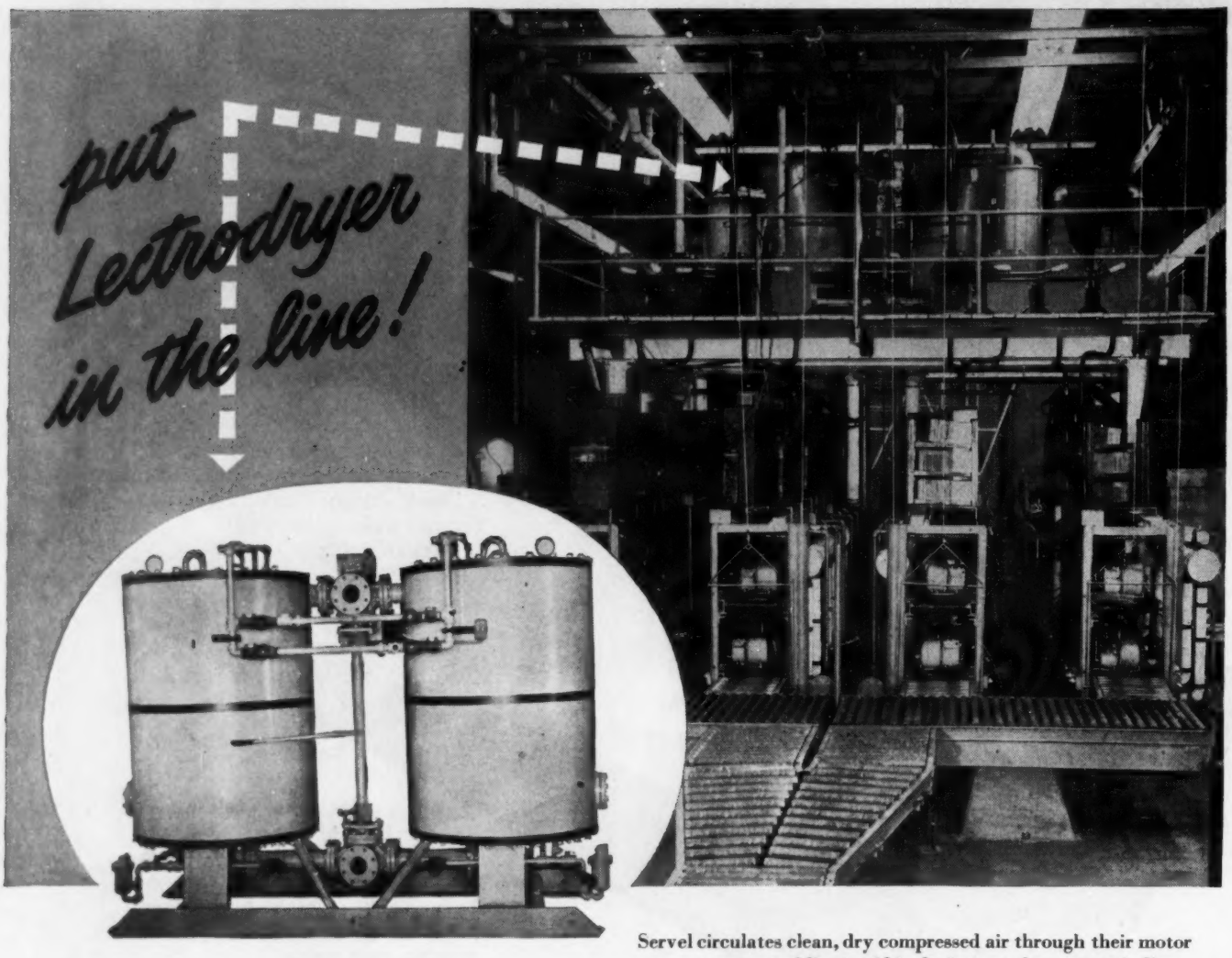
DC WELDERS

AC WELDERS




WELDING ELECTRODES

# WHEN YOU'RE TOOLING UP FOR PRODUCTION




Servel circulates clean, dry compressed air through their motor compressor assemblies to aid in drying out the motor windings. Lectrodryer does the DRYing; a Lectrofilter removes all oil.

Use these DRYing machines just like any other machine tool. Spot them right in the assembly line where their drying function is required. Put them "on stream" in your chemical processes.

Lectrodryers work 24 hours a day—no rest periods or down time—one column taking over the DRYing job while the other is being regenerated by heat. This cycle can be controlled automatically or manually. At Servel, the foremen reverse the valve at the start of every eight-hour shift.

Air, gases or organic liquids—Lectrodryers DRY them all. In laboratory volumes or wholesale, at atmospheric pressure up to 3,000 pounds per square inch, to moderate dewpoints or as low as −100° F.—there are Lectrodryers to handle them all.

Lectrodryer engineers welcome your inquiries. No need to waste your valuable time on unfamiliar DRYing problems. Write Pittsburgh Lectrodryer Corporation, 323 32nd Street, Pittsburgh, Penna.

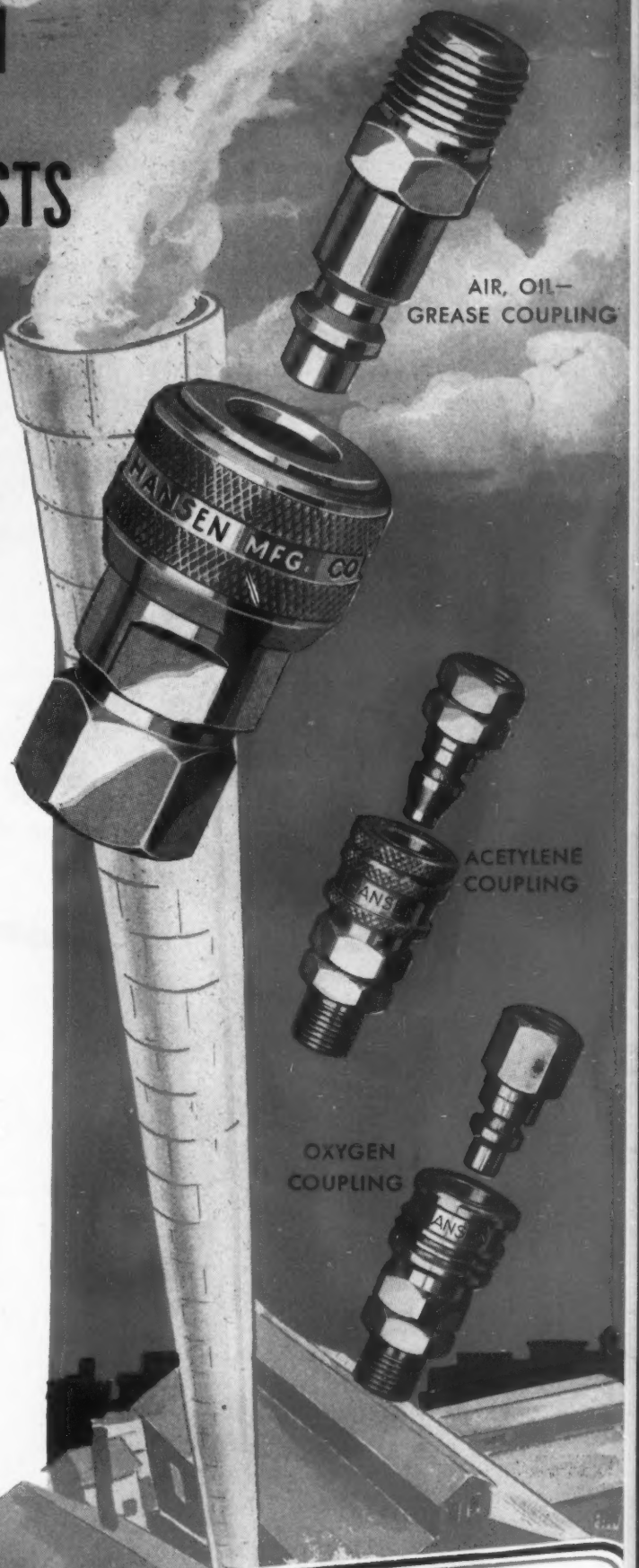
In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sidney.

LECTRODRYERS DRY
WITH ACTIVATED ALUMINAS

**LECTRODRYER**
REGISTERED TRADEMARK U.S. PAT. OFF.

# INCREASED PRODUCTION
## IS ONE THING
# CUTTING PRODUCTION COSTS
## IS ANOTHER

# HANSEN
## COUPLINGS
## DO BOTH




Connections and change-overs become a matter of seconds when you use Hansen Couplings. That means time and money saved with no hold-up of costly operations.

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*Hansen couplings for industrial uses.*

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# *Why* RIGHT ANGLE LOADING ASSURES LONGER BEARING LIFE

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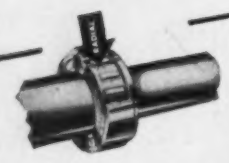
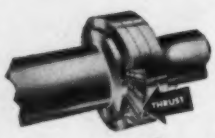
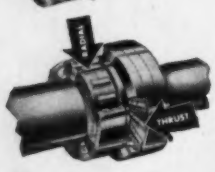


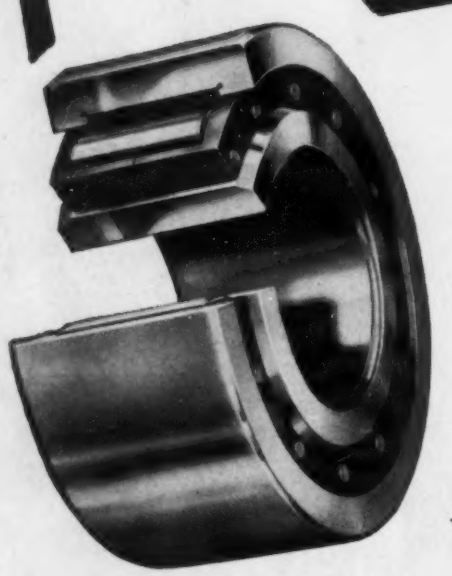
- When the load is pure radial, it bears at a right angle to the rollers.



- When the load is pure thrust, it bears at a right angle to the rollers.



- When radial and thrust are combined the two loads are resolved separately at a right angle to the rollers.



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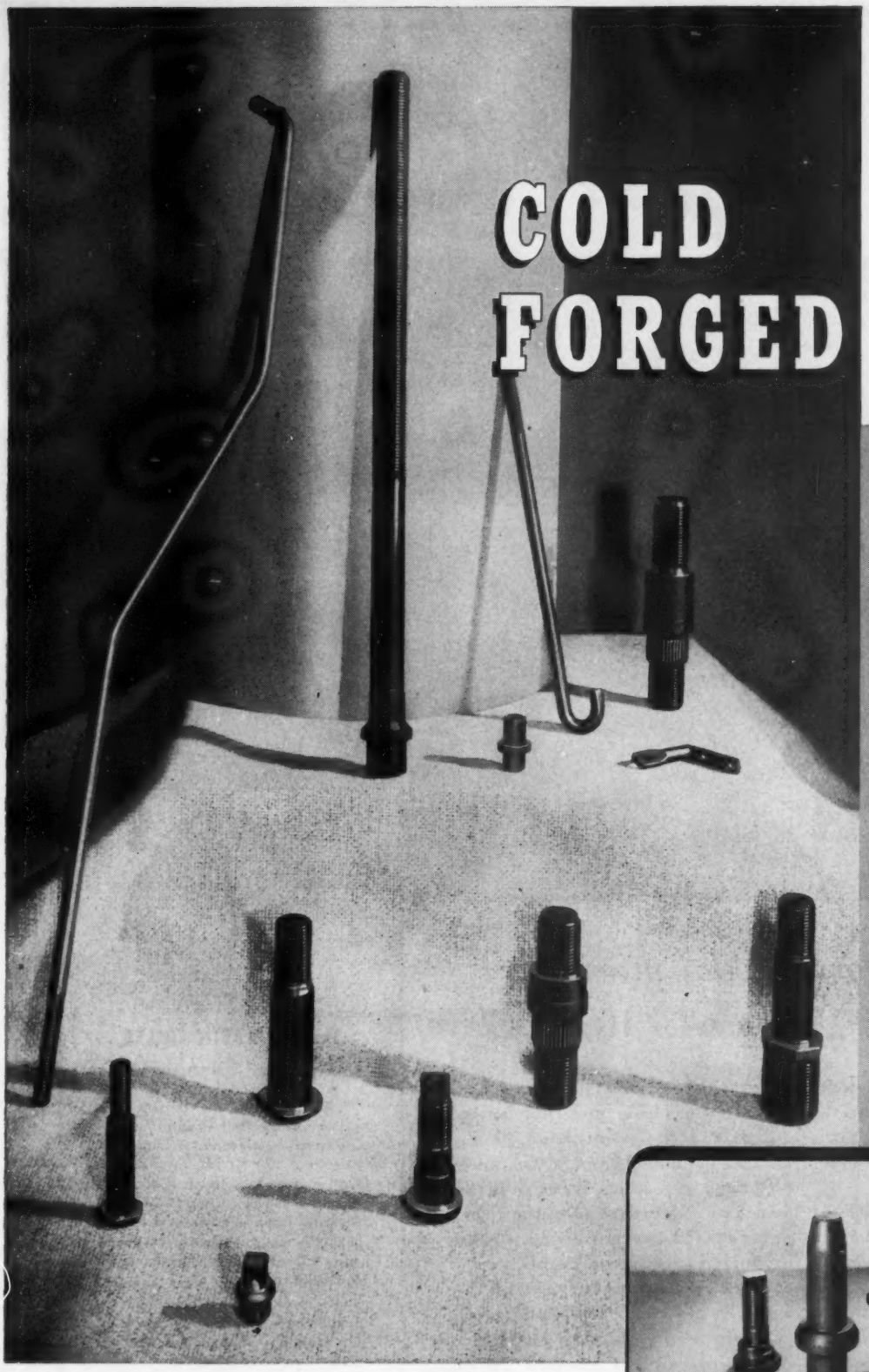

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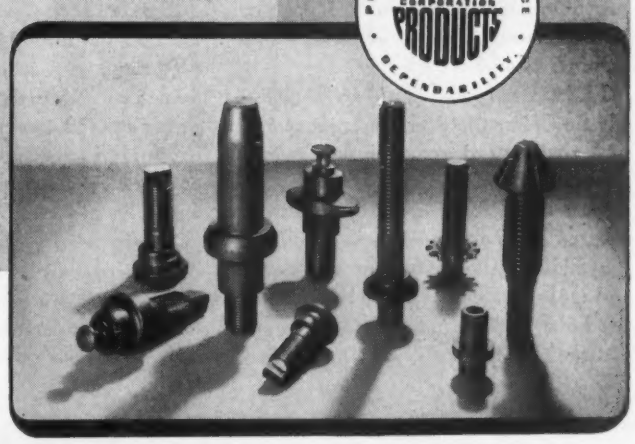

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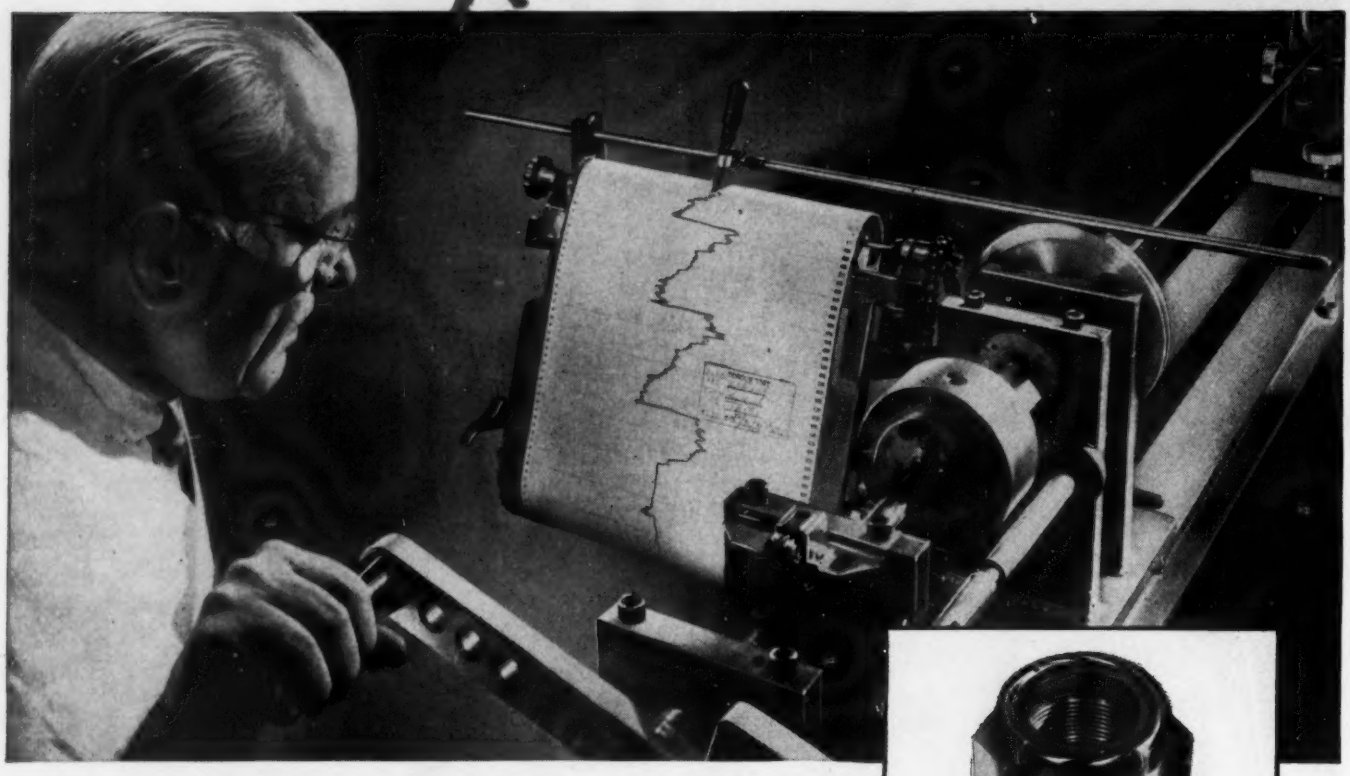
# A-N TORQUE TESTS *Prove Reusability* OF ELASTIC STOP NUTS



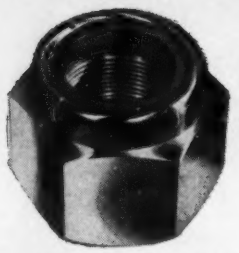
## *—the Red Elastic Collar provides dependable locking torque for* RE-USE!

Army and Navy specifications for aircraft lock nuts include a specific torque test to prove locking effectiveness. Lock nuts have to maintain adequate locking torque through 15 on-and-off cycles.

ESNA Elastic Stop Nuts—with the Red Elastic Collar that has become a symbol of security to all aviation engineers—remain self-locking against Vibration, Impact and Stress Reversal in both prestressed and positioned settings.

In addition, the self-locking, self-sealing and reusable Red Elastic Collar protects the bolt. It does not deform the bolt, damage the threads or gall the finish.

Reusable ESNA Elastic Stop Nuts provide dependable protection against Vibration, Thread Corrosion, Thread Failure, and Liquid Seepage. This multiple protection—which has made Elastic Stop Nuts the standard fastener on many products—also achieves the double economy of inventory simplification and reduced procurement costs. ESNA engineers are now ready to study your fastener problems. Address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are conveniently located in many principal cities.



**The RED ELASTIC COLLAR**

—denoting an ESNA product—

...is threadless and dependably elastic. Every bolt—*regardless of commercial tolerances*—impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads—and eliminates all axial play between bolt and nut threads.

All ESNA Elastic Stop Nuts—*regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

# ELASTIC STOP NUTS

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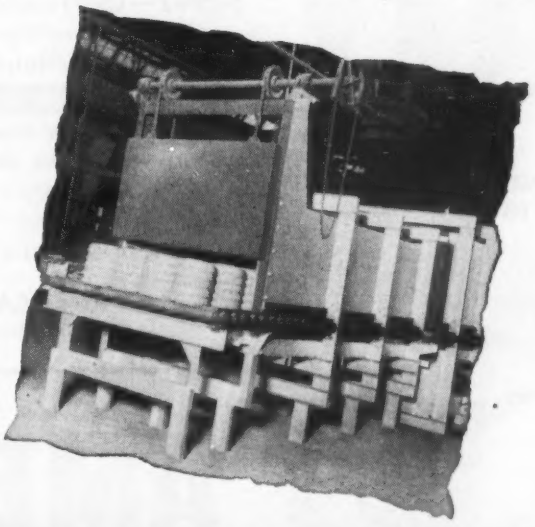

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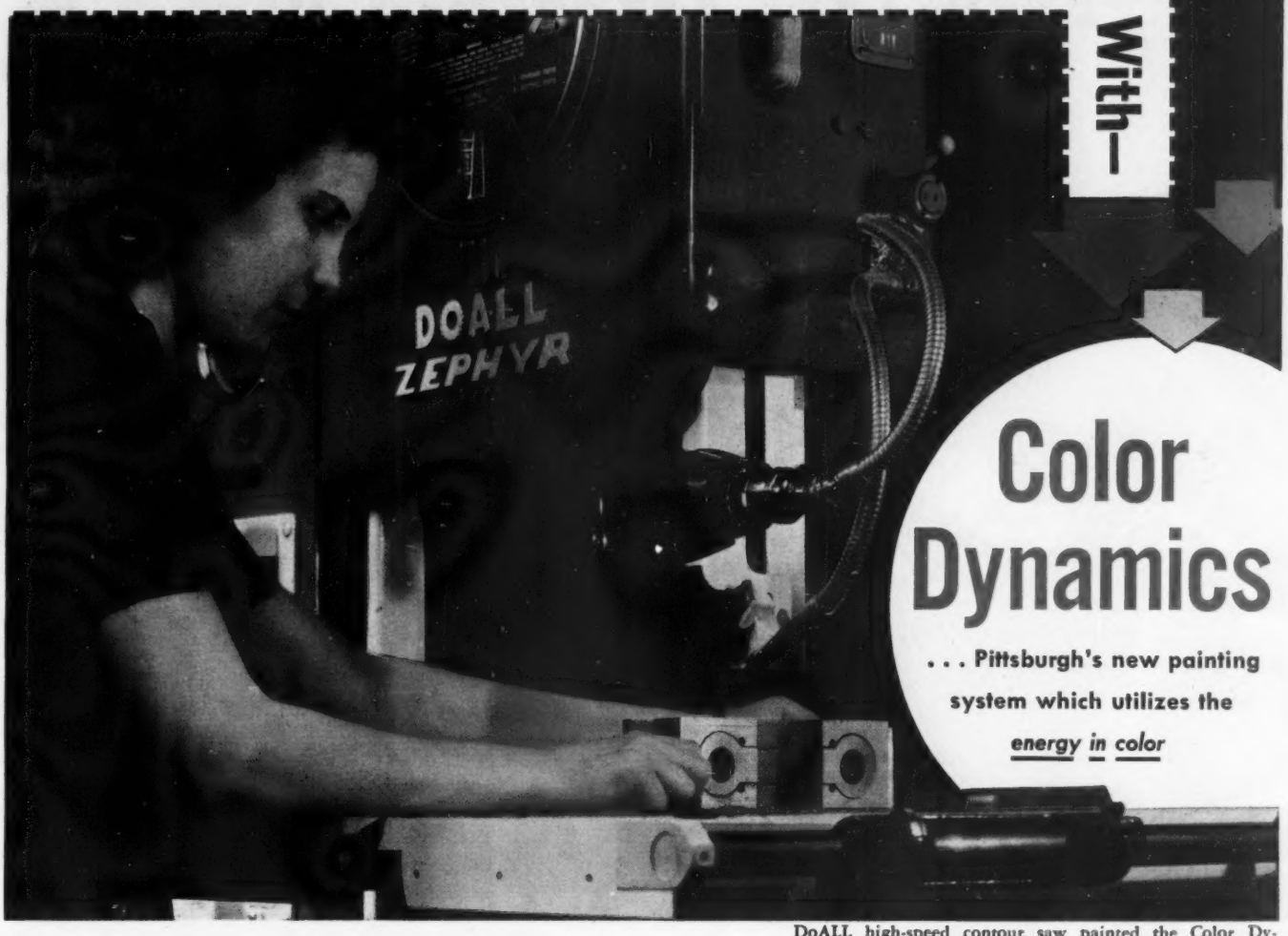


## Color Dynamics

**. . . Pittsburgh's new painting system which utilizes the *energy in color***

DoALL high-speed contour saw painted the Color Dynamics way, improves worker's vision, lessens eye fatigue.

THE DoALL Company of Minneapolis, nationally-known machine and cutting tool manufacturer, has just introduced a new series of products painted according to the principles of Pittsburgh's science of COLOR DYNAMICS.

These principles are based upon the tested reactions of human beings to the *energy in color!*

**By applying** this knowledge to the painting of machine tools, the well-being, safety and efficiency of their operators are improved. The result is *more work per man-hour and more man-hours per man* from this equipment when placed in your plant.

COLOR DYNAMICS helps to separate the working parts from the stationary parts and the materials being worked on. The worker's visibility is improved. Eye fatigue, so often the cause of lowered efficiency, is lessened. The job is made safer and the employee's attitude toward his task is bettered.

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● ***When you visit** the DoALL display in Booth 37 at the National Machine Tool Builders' Exposition in Chicago, Sept. 17-26, arrange to see the complete showing of machine tools painted according to COLOR DYNAMICS, at DoALL's Des Plaines plant.*

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*PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS*

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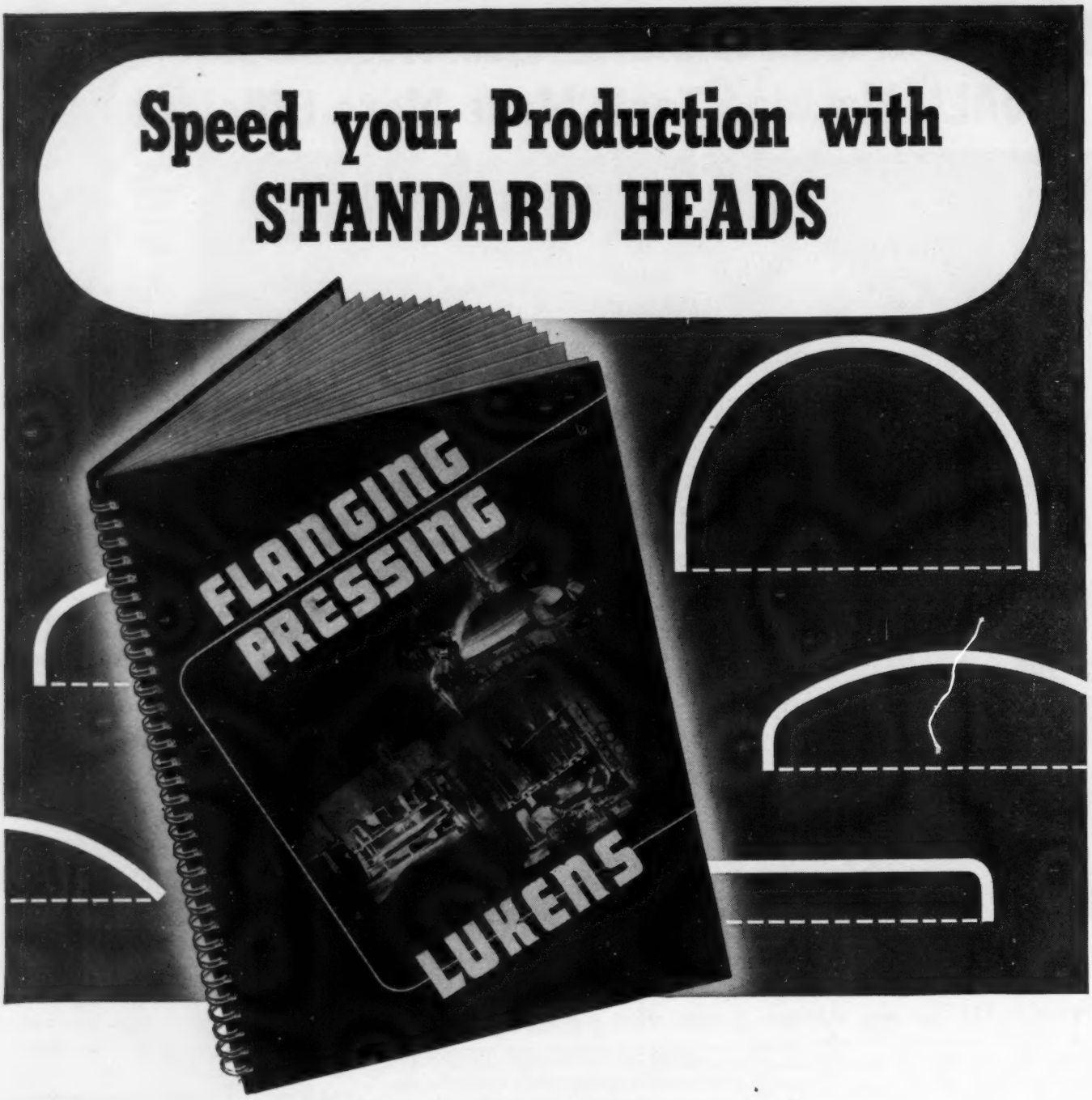


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- Surface Quality of Zinc Die Castings
- Metallized Electrical Circuits
- Control System Increases Mill Output


# STEEL

***The Magazine of Metalworking and Metalproducing***

VOL. 121, NO. 10 SEPTEMBER 8, 1947


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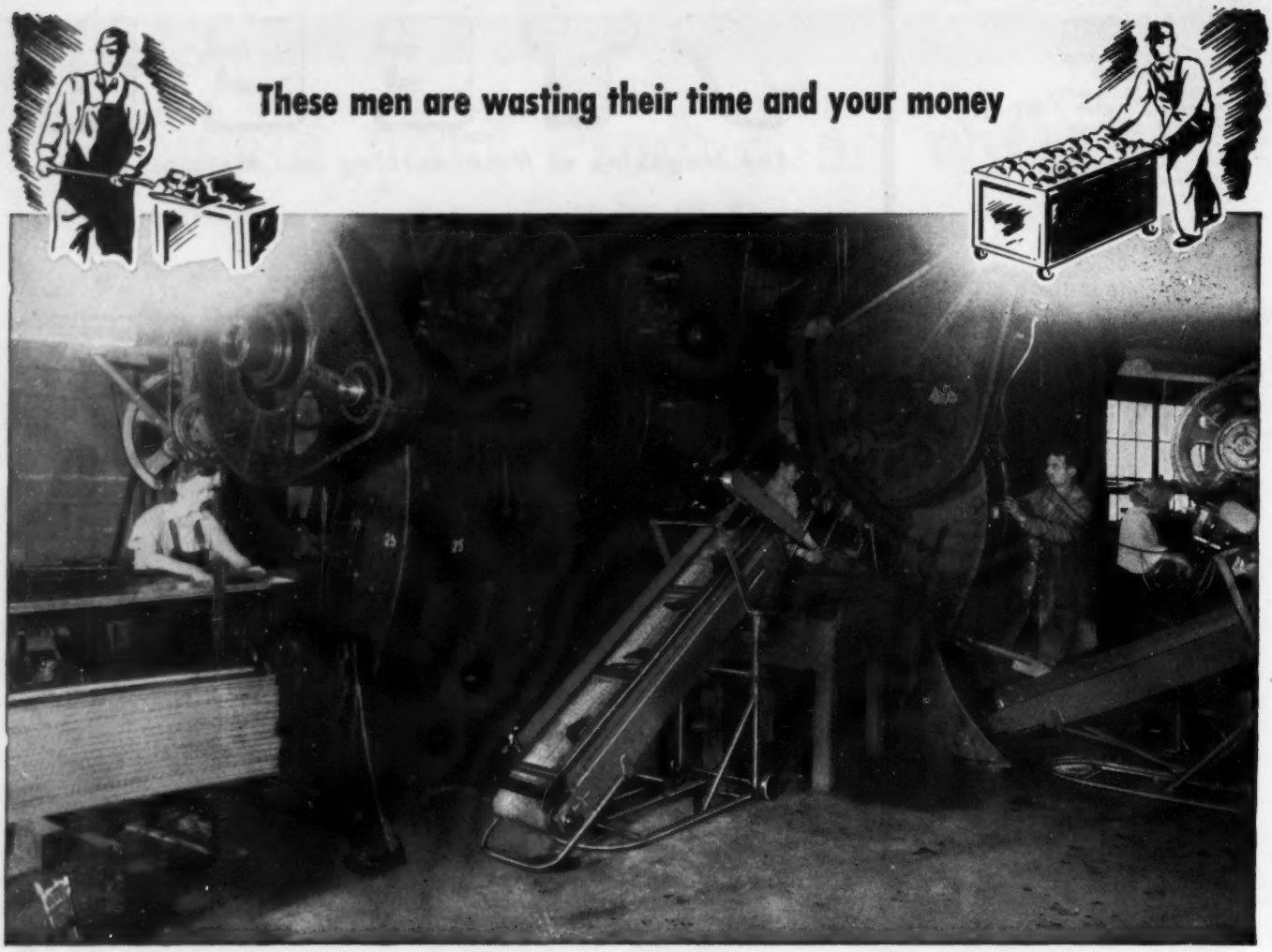


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Don't let a man do a job that could be done faster and more economically with a Rapids-Standard Press-Veyor. He adds nothing to the value of your product. He is part of the high cost of manufactured goods. You can't afford to let him stoop and shovel all day. Move him to a job where his human skill increases the value of your product. Let a Press-Veyor (with the strength of many men) do this heavy monotonous work.

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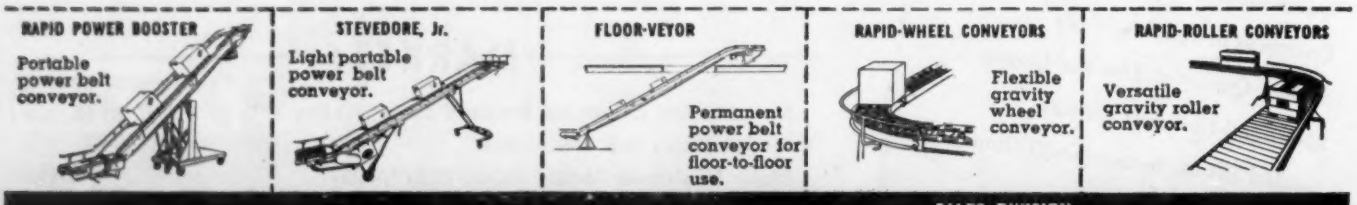
Write today for complete information on the Press-Veyor and how it can help you achieve smoother flowing, faster, more efficient production.

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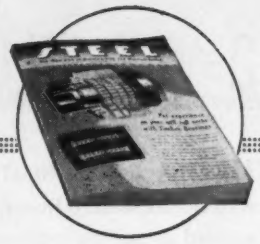



September 8, 1947

# The Real Danger

In "A Voice from the Country"—syndicated feature by Louis Bromfield—this world traveler, author and practical gentleman farmer writes with obvious nostalgic reluctance that he has been forced to the conclusion that two cherished American institutions are doomed. One is the old-fashioned, pioneer pattern, self-sufficient, general farm. The other is "countless small enterprises, save under exceptional circumstances."

Mr. Bromfield goes on to argue convincingly that the specialized farm, regardless of size, produces from 5 to 10 times as much income with much less labor than the same acreage operated under the old system of general farming where the hunter-trapper-farmer and his egg-money conscious wife raised a little of everything and not much of anything. One can easily agree that the trend is toward the specialized farm, but will not the security of the all-purpose farm continue to appeal strongly to independent-minded farmers?

Also, we doubt very much whether Mr. Bromfield is justified in writing off small enterprises, even with the sweeping qualification of "save under exceptional circumstances."

In the first place, small enterprises are businesses started by individuals who are confident enough to think they can do better on their own than by working for somebody else. In your own industrial field, think of your own acquaintances who, after working for corporations, have left them to go into business for themselves. Every industrial concern of size and maturity has an illustrious alumni of ex-employees who have created businesses of their own.

Why do these persons break away from their employers? Usually it is because the individual has an idea or a specialized ability which he thinks he can develop more profitably on his own than by continuing in the service of an employer who probably does not share his confidence or enthusiasm. Depressions may chill the ardor of these would-be entrepreneurs temporarily, but there is nothing in the long-term trend of increasing complexity in business that seems to daunt them. The more complicated the modern economic system, the greater is the opportunity for specialization in small enterprise.

For this reason, we are not worrying about the alleged impairment of opportunity for the ambitious individual to start a business on a shoestring. What concerns us more deeply is the growing evidence that once the small businessman begins to make a notable success, he is gobbled up by a big competitor.

This, to our mind, is the real problem of "small enterprise."

° ° °

**A LIFT FOR GERMANY:** Another step in the evolution of a workable postwar plan for Germany has been taken by British and American conferees who have agreed upon a "level of industry" substantially higher than that adopted in March, 1946.

The Anglo-American agreement calls for a German steel ingot capacity of 10,700,000 tons compared with an earlier limitation of 7,500,000 tons. It also provides that 35 per cent of the capacity for building heavy machinery and 23 per cent of that for light machinery shall be made available for reparations as compared with previous percentages of 60 and 33 per cent, respectively.

This easing of limitations is prompted by a belated realization that the initial harsh terms doomed Western Europe to a hopeless condition requiring long-continued assistance from outside, with the major burden falling upon Britain and the United States.

This latest "level of industry" agreement should be looked upon as being significant as to intent but

(OVER)

# AS THE EDITOR VIEWS THE NEWS

not necessarily binding or final as to exact terms. Numerous developments, none of which can be foreseen by even the ablest of planners, could cause the "level" to be raised or lowered. It is an attempt to break the stalemate caused largely by the stubborn refusal of Moscow to co-operate in any move to make Germany self-supporting. —p. 56

• • •

**MACHINES IN MINES:** In 1945, of the total tonnage of bituminous coal mined in the United States, 36 per cent was hand loaded underground, 45 per cent was mechanically loaded underground and 19 per cent was strip mined. In 1946 the comparable percentages were 33, 46 and 21, respectively. Thus in a year's time hand loading decreased by 3 percentage points.

Most authorities believe that the higher wages provided in the latest mine workers' contract will further accelerate mechanization. Practically all manufacturers of mechanical coal mining equipment report backlogs of orders are the largest in history. It is a fairly safe prediction that the year is not far off when 25 per cent or less of American bituminous coal mined will be hand loaded.

The low degree of mechanization in British mines frequently is mentioned as a major cause of Britain's coal crisis. It is an important factor, but not more so than inadequate food, insufficient manpower and willingness to work. —pp. 43, 52

• • •

**FASCINATING CHALLENGE:** Clyde E. Williams, director of Battelle Memorial Institute and principal speaker at the dinner meeting of the American Society of Mechanical Engineers at Salt Lake City last Tuesday, predicted that "super metals" will be developed to meet the needs of future propulsion and power generation machinery.

New and revolutionary forms of power generation and transportation are being developed by the Army and Navy, he reported, which will require stronger and more heat-resistant materials. Dr. Williams discussed alloys that have been developed for gas turbine and other high-temperature work and declared that engineers are seeking materials that will withstand even higher stresses and temperatures. Even the best "super metals" may not serve forthcoming demands and it may be necessary, he believes, to employ ceramic materials as coatings for metals, as structural combinations with metals or as individual parts.

Here is a new vista of opportunity for engineering materials which presents a fascinating challenge to metallurgists and engineers. —p. 48

**SIGNS OF THE TIMES:** John R. Steelman, as chairman of the Scientific Research Board, uses the present plight of England as an illustration to bolster the board's recommendation to President Truman for a long-term national science program. He also stressed a point that is not often considered in connection with the success of our economy. "As a people," he declares (p. 52), "our strength has lain in practical application of scientific principles, rather than in original discoveries." . . . Indicative of the painfully slow recovery in parts of Europe is the fact that the first locomotive to be built in France since the end of the war (p. 57), has just been delivered by Ateliers Franco-Belge at Raimes. It took 18 months to build. . . . The Labor Day speeches of some labor leaders showed how difficult will be the administration of the Taft-Hartley Act. The conflicting views of the unions and the government administration on one hand and of Congress on the other (p. 55) probably will keep NLRB in a "sweatbox" for months. . . . Walter Leaf, research technician of Denver & Rio Grande Western Railroad, told members of ASME at Salt Lake City last week (p. 48), that most railroad rails of the future will have a new shape. "At the present time," he reported, "most rail mills have made or are making rolls to produce the improved sections." . . . Two overhead trolley conveyors—one a powered unit running over the other—team-up in the new Chevrolet assembly plant at Flint, Mich. (p. 72), to overcome a multitude of small and major materials handling problems. The system can be arranged to run at any elevation required for efficient operator performance. . . . National Machine Tool Builders Association, sponsor of the 1947 Machine Tool Show to be held in Chicago, Sept. 17-26, (p. 51), has received advance registrations from all parts of the United States and Canada, and from 30 overseas countries. Arrangements have been made for 150 special busses to transport visitors between downtown Chicago and the Dodge plant. . . . By comparing the probable supply of steelmaking scrap that will be available from now through next March with the amount of scrap actually consumed during that period a year ago (p. 46), it is apparent that the scrap situation will continue tight, if ingot production is to remain near the 90 per cent of capacity level.

E. L. Shaner

EDITOR-IN-CHIEF

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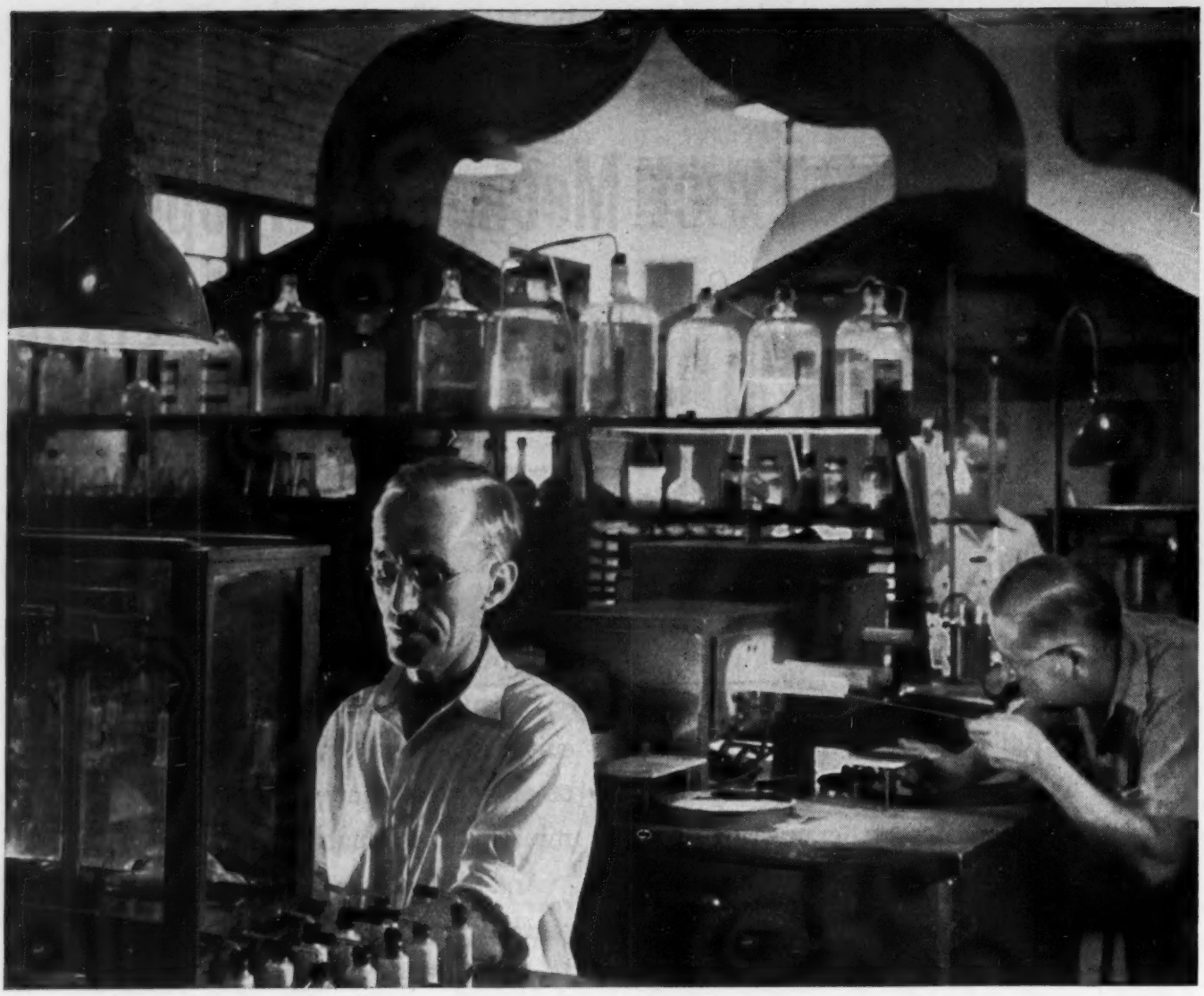

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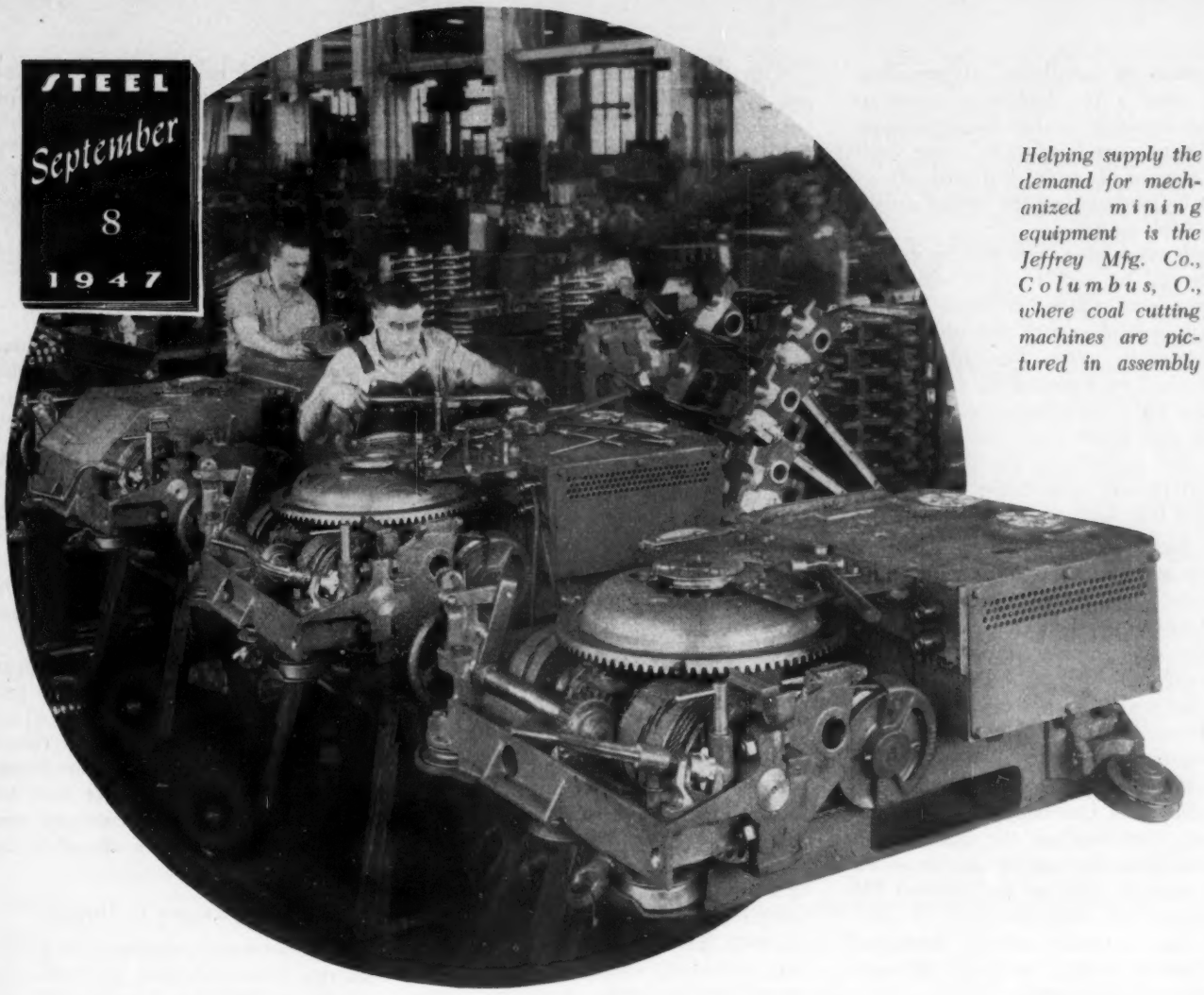


*Helping supply the demand for mechanized mining equipment is the Jeffrey Mfg. Co., Columbus, O., where coal cutting machines are pictured in assembly*

# Mine Mechanization Accelerated

By VANCE BELL
*Associate Editor, STEEL*

***Operators look to increased use of machinery as means of offsetting higher mine labor costs. Movement expected to extend use of mechanical power to jobs previously done by hand and to bring forth machinery of new efficiency***

BETWEEN the lines of the coal miners' new wage contract, manufacturers of mining machinery see a stimulus to their business.

And a boost to their business will exert a demand down through various segments of the metalworking industry for materials and components that are requisite in the assembly of mining equipment.

While there already is a considerable degree of mechanization in the mines there still is substantial room for further mechanization, and observers, recalling that general wage increases such as provided in the new mine contract have always been additional stimuli to mechanization, believe the contract will spur mine operators to extend the use of power and machinery to additional operations previously done by hand and to seek equipment that will surpass efficiency of their present machinery.

In fact, continuance of a high rate of industrial production may necessitate additional mechanization if a sufficient volume of coal is to be available to support this high plane of activity. Since the miners returned to work under their new contract in July, their output each week has been below that of the corresponding week a year ago. In contrast to weekly bituminous coal production of from 12½ to 13 million tons before the new contract became effective, the output since then has been only slightly above 11½ million tons.

Opportunity for mechanization of a mine exists both in its underground and in its surface operations, but the underground operations employ the most labor and therefore provide the best opportunity for making savings through mechanization.

Even if higher labor costs were not enough to encourage further mechanization, a continued high level of employment in the nation might make it necessary to adopt machinery that would ease the work of a miner and make the job attractive enough that a sufficient number of men could be kept in the ranks of miners. More than half of the nation's mines, for example, are in seams less than 48 inches in height, and the mere task of moving about requires physical effort greater than in many industrial operations. Today when so much of the industry is mechanized and men have so many opportunities for jobs requiring only moderate exertion, any job requiring considerable physical effort is unattractive and it is therefore difficult to get men to work at it.

While increased labor costs have spurred mine operators to give increasing thought to new and additional equipment, the rising prices on such equipment have in some cases caused operators to consider very carefully the

economics of installation at prevailing high prices. Yet, bituminous operators cannot overlook the fact huge tonnages of materials are handled at a very small net margin of profit and that efforts must be made to prevent further shrinkage of this margin.

High mine labor costs may be expected to call for new types of equipment to save labor which heretofore had not been important enough to justify saving. For instance, power manipulated drills (or jumbos) are replacing the earlier models that had to be adjusted by hand. Power is also being used, and needed, to shift the position of the duckbill employed in loading a shaker conveyor, a manual task until recently.

In fact, the extension of the use of power and machinery to additional operations hitherto done by hand was an outstanding development of 1946. Examples were the use of power to position drilling heads on drilling machines and the wider use of recently developed machines for facilitating timbering in underground mines.

In the movement toward further mechanization, the bituminous mining industry in 1946 installed 490 mobile loading machines, the highest number in history, and put into use underground 838 conveyors and three scrapers. In addition, the anthracite industry purchased five mobile loading machines, 319 conveyors and 32 scrapers.

With this added equipment, production by various methods in the bituminous industry in 1946 compared with 1945 has been estimated in percentages as follows:

| | 1946 | 1945 |
|---|---|---|
| Mechanically loaded underground (including coal hand loaded onto conveyors) | 46 | 45 |
| Hand loaded underground | 33 | 36 |
| Strip mining | 21 | 19 |

Underground the physical conditions permitting the installation of machinery vary widely and the mine machinery manufacturer is faced with the problem of producing a very considerable number of varieties and types. For this reason most mining machinery is built to order and tailor-made for the mine where it will be used. Therefore, increased sales of mine machinery may not result in lower direct production costs of the machinery.

In their current operations, a substantial portion of mining equipment manufacturers report they are hampered by insufficient supplies of materials and components.

Incidentally, the coal mining industry as a whole has been faring increasingly better in receipts of steel, according to figures from the American Iron & Steel Institute. During the first four months of 1947 the industry received 63,509 tons, compared with 66,949 in the last six months of 1946. Additional comparisons follow in the table of net tonnages of the coal mining industry's receipts of steel:

| 1947 | | 1947 | |
|---|---|---|---|
| January, | 12,926 | March, | 15,116 |
| February, | 17,655 | April, | 17,812 |
| Total, four months, | | | 63,509 |
| First half, 1946, | | | 45,279 |
| Last half, 1946, | | | 66,949 |
| Year, 1946, | | | 112,228 |
| 1944 (including mining, quarrying, lumbering), | | | 212,480 |
| 1940 (including mining, quarrying, lumbering), | | | 141,325 |

Commenting on the current situation, the Goodman Mfg. Co., Chicago, manufacturer of electric mining machinery, said it has experienced shortages of both materials and labor this year, but added there has been some improvement recently in both. Major materials shortages reported by the company are in steel sheets, steel and malleable castings, electric motors, particularly of the permissible type, and their control equipment, and ball bearings. As to labor, the Goodman company said it desired to operate a substantial night shift but that it cannot find the necessary men since many day jobs are offered in the Chicago area.

### Backlog Largest in History

The Goodman company said that ignoring price increases, its production volume in 1947 has been double that of 1940. "Our backlog of unshipped orders for mining machinery for coal mines is the largest in our history, and depending upon the type of machine wanted, our deliveries are running from six to 24 months."

Concerning price trends, the Goodman company said that through a high volume of production it has been able to absorb increased costs of materials and labor and thereby hold down price rises.

Roberts & Schaefer Co., coal mining plant engineer and contractor, Chicago, reports it is enjoying the best year's business in its history. "Our backlog is the largest ever experienced, and we will close this year with the largest backlog in our history.

"Some materials," said Roberts & Schaefer, "are coming along in fairly good volume but we are handicapped by shortages of some supplies such as steel, motors, electrical controls and wiring."

Indication that rising prices of equipment are having some effect on mine mechanization plans is seen in the report of Roberts & Schaefer that while the demand for coal mine and coal preparation equipment is beyond its expectations, it does find that "since the prices of coal preparation plants have been on the increase and have reached such high amounts the operators are beginning to

*A mechanical loader eases and speeds operations in the U. S. Steel Corp.'s Robena mine, near Carmichael, Pa. This track-mounted machine loads coal into 6½-ton mine cars which carry it to a rotary dump where mixing and blending takes place*

consider very carefully the economics of installations at prevailing high prices."

However, in 1946 approximately 78 installations of coal preparation facilities were made at bituminous mines. Although that number is only two more than were installed in 1945, the capacity of the 1946 installations totaled 25,565 tons an hour, considerably above the hourly capacity of 18,840 tons installed in 1945.

The Joy Mfg. Co., Pittsburgh, which was merged a little more than a year ago with Sullivan Machinery Co. and LaDel Mfg. Co., reports that its volume of mine equipment sales has increased out of all proportion to the amount of business done by the various companies before the merger. "Our order backlog has continued to increase, and we see no slackening in the demand for coal mining equipment. We have been handicapped by some shortages of some materials, one of them being steel. Delivery on certain items," the company said, "is worse than it was during the war, probably because of the high priority that mining machinery was granted under the War Production Board."

As to the outlook for business, the Joy Mfg. Co. said, "the mechanization of unmechanized mines, and the substitution of improved machinery seem to indicate a generally increasing market in mine equipment during the next ten years."

Clarkson Mfg. Co., Nashville, Ill., manufacturer of mechanical coal loaders, pointing out that the increase of coal mine labor rates has materially stimulated the incentive to mechanize, said that at the present time the demand for equipment is very heavy. "Electric motors and steel supplies are very slow. Labor is plentiful and backlog of orders is approximately 12 to 14 months."

General Electric Co., Schenectady, N. Y., manufacturer of mine locomotives, said, "there is no doubt that continued increases in coal mine labor costs furnish an incentive toward further mechanization of the mines."

The company's mining locomotives for the first six months of 1947 were about 50 per cent ahead of those for the corresponding months of 1946 in number of units. In spite of difficulties in obtaining materials and component parts, GE was successful in cutting down its backlog of unfilled orders by a small amount last year and expects to make further improvement in this respect this year. The company has been handicapped seriously by shortages of materials, particularly copper, but the situation appears to be easing somewhat.

Commenting on the prospects for future business, GE said, "the increasing use of machinery for cutting and loading coal has brought with it a demand for larger and more powerful haulage locomotives and for gather locomotives adapted to the requirements of machine loading. We anticipate a continued demand for modern mine locomotives to enable the mine transportation systems to keep pace with the increased rate of production brought about by mechanization."

Myers-Whaley Co., Knoxville, Tenn., maker of shoveling and loading machines, said, "We believe that increased mine labor costs emphasize the need for mechanization in the mines. There is a general feeling along this line in the mining industry, and many companies are mechanizing as fast as they can get the equipment. Some rather large plans, of course, are slow to materialize, but the outlook is very good and we think there will be a good demand for coal mining equipment for some years.

"Our production," said Myers-Whaley, "has been increased and we are now in position to ship within three to four months after receipt of order, instead of eight to ten months."

Also optimistic about the future is the Robins Conveyors Division of Hewitt-Robins Inc., Passaic, N. J., which said: "The demand for mechanized mining equipment is definitely greater for 1947 than for either 1945 or 1946, and, using today's trend as a barometer, 1948 should be a mechanized mining year."

Rising prices of coal are looked to by the American Pulverizer Co., St. Louis, as a spur to demand for its coal preparation equipment. The company, manufacturer of crushers, shredders, and pulverizers, said: "It is our thought that as the price of coal goes up the quality of the preparation will have to be improved and this, of course, will also place some emphasis on our equipment." The company's present backlog of orders is larger than it was in years before the war, although all the backlog is not due to buying on the part of coal mines. In attempting to fill these orders the company has been handicapped by shortages of materials, particularly steel plates, bars, and structural shapes, and motors.

## Present, Past and Pending

### ■ CARBORUNDUM BUYS NEW PLANT SITE

NIAGARA FALLS, N. Y.—The Carborundum Co. has purchased 93 acres of land at Vancouver, Wash., as the site for a new $2 million silicon carbide plant. The plant will be part of a $15 million expansion and modernization program being undertaken by the company.

### ■ CARNEGIE REBUILDS COKE OVEN BATTERY

CLAIRTON, PA.—Carnegie-Illinois Steel Corp. has completed rebuilding the ovens of its No. 21 battery at the Clairton Works. Battery consists of 87 Koppers-Becker underjet type ovens with self-sealing doors and double collecting mains and has a carburizing capacity of approximately 2500 tons of coal daily.

### ■ RAIL OFFICIALS PONDER FURTHER RATE INCREASES

WASHINGTON—Officials of major railroads are considering boosting the size of their request for a 17 per cent increase in freight rate to cover the additional cost of the 15½-cent hourly wage increase granted nonoperating railroad workers. The wage increase is estimated to add $438 million to the carriers' operating costs.

### ■ FORD TRACTOR PRODUCTION REACHES NEW PEAK

DETROIT—Output of the new 8N Ford tractor has reached a record high of 400 a day. Barring materials shortages, production is expected to reach 430 daily by October and 450 by December.

### ■ STEEP ROCK ORE SHIPMENTS AT NEW HIGH

STEEP ROCK, ONT.—Steep Rock Iron Mines Ltd. set a new monthiy high in August with shipments of 237,424 tons of high-grade iron ore from its western Ontario mines. Shipments for the year to Sept. 1 total 784,626 tons. Company reports it is planning to develop four additional mines in the same range.

### ■ ALUMINUM PIPE USED FOR FARM IRRIGATION

PITTSBURGH—Use of aluminum pipe for portable irrigation systems for farms is developing into a major industry. Aluminum Co. of America is now turning out about 5½ million feet annually, an increase of 250 per cent over last year.

# Prospects Dim for Early Scrap Relief

***Continued tight supply situation threatened over winter and into next spring. Repair of blast furnaces seen increasing burden on scrap***

*After yielding a considerable volume of much-needed scrap to the iron and steel industry, the hull of the once palatial liner "Normandie" is down almost to the water line at Port Newark, N. J. NEA photo*

ALTHOUGH some of the zip has gone out of the iron and steel scrap market, prices on steelmaking grades currently being more or less static around $38 to $40 per ton as against $42 to $43 at the beginning of August, this market continues in an unusually strong position.

The simple fact is scrap supplies are limited and show little sign of improving over coming months with consumption promising to hold at a high level as steelmakers push producing facilities to the limit in their drive to satisfy the greatest peacetime demand for steel ever experienced.

Scrap has been scarce all year long. Today, despite the recent easing in prices and relatively light purchasing by the mills in recent weeks, the supply situation is little, if any, improved over that of early summer. Actually, all signs point to an even tighter supply situation over coming months, especially during the winter and early spring when collections and preparation normally are hampered by adverse weather conditions.

All of which lends a strong underlying tone to the market. Further contributing to basic strength is the fact that from all present indications the steelmakers will be forced to depend on scrap to an increasing extent over the winter months to support furnace melts since some curtailment of pig iron production is in prospect due to projected removal of a number of blast furnaces from the active list to permit urgently needed repairs. On Aug. 1, this year, there were 16 idle stacks in this country which compared with 19 on the like date in 1946. Some of these idle furnaces may be returned to blast in the near future but no early substantial relief in the pig iron supply situation seems in prospect with a number of currently active blast furnaces being scheduled to go down for repairs beginning in November.

If anything, scrap consumption over the remainder of this year and into next spring will be even greater than it was in the like months of 1946-47. If steel ingot operations are to be maintained at only the average monthly rate of the 1946-47 winter-spring period, 87.7 per cent, tremendous quantities of scrap will have to be provided between now and next March. In the period September, 1946, through March, 1947, a total of 21,833,000 tons of scrap and 24,713,000 tons of pig iron were consumed in steelmaking furnaces. Of the total scrap consumed, 9,611,000 tons were purchased scrap, and 12,222,000 tons home scrap, with a monthly average consumption of 1,373,000 and 1,746,000 tons respectively. Consumption in openhearth, bessemer and electric furnaces in the seven months, September, 1946, through March, 1947, is shown in the accompanying table.

**SCRAP AND PIG IRON CONSUMPTION IN STEELMAKING FURNACES**

(September, 1946 through March, 1947. Gross tons)

| 1946 | Purchased Scrap | Home Scrap | Pig Iron | Steel Ingot Rate |
|---|---|---|---|---|
| September | 1,266,000 | 1,725,000 | 3,543,000 | 86.9% |
| October | 1,393,000 | 1,868,000 | 3,687,000 | 89.0% |
| November | 1,314,000 | 1,773,000 | 3,392,000 | 85.4% |
| December | 1,328,000 | 1,483,000 | 2,953,000 | 73.9% |
| 1947 | | | | |
| January | 1,399,000 | 1,882,000 | 3,870,000 | 93.0% |
| February | 1,334,000 | 1,644,000 | 3,398,000 | 91.7% |
| March | 1,577,000 | 1,847,000 | 3,870,000 | 94.3% |
| Total | 9,611,000 | 12,222,000 | 24,713,000 | Av. 87.7% |
| Av. | 1,373,000 | 1,746,000 | 3,530,428 | |

The foregoing data cover only scrap consumed in steelmaking furnaces. If the scrap needs of other types of furnaces, such as blast furnaces, cupolas and miscellaneous are considered, it is readily seen that prospective demand should be sufficiently large to prevent any drastic slump in prices.

Perhaps this explains the scrap trade's optimism in the face of reported efforts of the steelmakers to force the current price level on steelmaking grades down to $35 per ton by withholding substantial purchase orders. In this latter effort, the steel producers are to considerable extent being aided by the receipt of scrap tonnages direct from customer sources. However, it is believed doubtful if such tonnage will be sufficient to support the high level of steelmaking and foundry operations anticipated over the winter and into next spring.

Situation in the various steelmaking centers as developed by STEEL's district editors follows:

## PITTSBURGH

Mills have been able to slightly augment iron and steel scrap inventories the past few weeks, reflecting heavy broker and dealer shipments of tonnages placed at the higher price levels of three to four weeks ago. In at least one instance outside this district, a producer was forced to hold up scrap shipments due to inability to unload carloads of scrap fast enough.

Consumers' iron and steel scrap stocks are currently estimated at between 4 to 5 weeks' supply, in contrast to 3 to 4 weeks less than 6 weeks ago. However, the outlook for adequate scrap supply through the winter months is not too bright, although most industry officials contend that no significant steel

tonnage will be lost due to the scarcity of scrap if the present steady flow of incoming scrap can be maintained. Most pressing problem at the moment is the unbalanced inventory position among the industry members and relatively poor quality of much of the scrap being shipped.

Leading mill interests contend that the one thing which would give more assurance for adequate scrap supplies this winter would be more active cooperation on part of the War Assets Administration and other government agencies. There is no accurate estimate of scrap tonnage that could be released by WAA, estimates ranging from 1 to 3 million tons.

One encouraging sign is the fact that the shipbreaking program is making good progress, with scrap shipments originating from this source now averaging close to 80,000 tons monthly. Battlefield scrap also is another important scrap source, although mill interests are reluctant to make too heavy commitments in this connection because of the difficulty in determining extent and screening out alloy grades.

Movement of farm scrap is expected to record some improvement this fall, now that prices are high enough to attract more intensive collection efforts. A slight increase in railroad scrap offerings has developed recently, and should register further improvement as the freight car construction program gathers momentum. No significant change in industrial scrap volume is indicated for remainder of this year, due to the continued shortage of most finished steel products limiting production schedules.

Steel industry officials hope to gradually establish a $35 market here for heavy melting steel.

One important distributing factor in present scrap market is special ingot deal negotiations on a cost-plus basis.

## CHICAGO

Consumers of scrap in this area face the prospect of another winter during which supply and demand of melting material will be uncomfortably nip and tuck. Certainly, the supply is only slightly better than consumption, a situation which prevents laying down substantial tonnages in reserve inventory. Furthermore, building up of stocks is discouraged by price nervousness. Unusually heavy consumer demand and narrow supplies in recent months have quickly resulted in bounding prices.

At the present moment, brokers and dealers are busy filling old orders placed at prices which ranged at figures up to $42.50 for heavy melting steel delivered consumer. They claim it is necessary to pay in the neighborhood of $41 a ton for material to meet these obligations; consequently, there is little attraction in making new commitments at the $39 price which mills now are offering. Perhaps another two weeks may elapse before old business is concluded. In the meantime, quoted consumer buying prices are largely nominal.

During the past month, excessive heat has slowed the collection and preparation of scrap, but this same heat has decreased steel production.

Every indication is that steel producers will go through the fall and winter with operating schedules close to 95 per cent of capacity, forecasting a steady and high level of scrap consumption. Blast furnace capacity already is being operated at full capacity, leaving no leeway for mills to lean more heavily on hot metal charges to offset scrap scarcity.

## YOUNGSTOWN

Some steel executives and scrap men continue to hold a dim view about the scrap situation and as to how it will affect the steel industry for some time to come.

Some believe that if the demand for steel continues at its unprecedented rate —and they feel pretty confident that it will—there are good prospects some of the district's 83 open hearths will be idle at some time or another next winter for lack of scrap. Some of them were idle during World War II during the peak demand.

A representative of one of the larger steel companies said that now "we're not in good shape but neither are we in bad shape, so far as scrap is concerned."

One steel man said collections are speeding up in the Southwest now, and this should benefit the whole industry; shortages will depend on how successful are these collections. He said he had heard of sales at $38 a ton.

A scrap man said the price apparently has leveled off and is based on $40 a ton scrap. He said he has not heard of any sales above that or any below that of recent date. He said the industry apparently has abandoned its $45.50 rate—a differential of $3—for scrap coming from beyond the $2.50 freight rate area. This scrap man looks for a considerable shortage this winter.

## PHILADELPHIA

A tight situation in steel scrap is expected over the remainder of the year. While the steel mills have slightly better inventories on hand than 45 days or so ago, it is doubtful if they have more than a scant 30 days' supply on an average. With winter coming on they should have at least 60 days' supply, but whether the mills will be able to reach such a level appears questionable at the moment.

With cooler weather at hand, the movement should pick up, at least as compared with the past three or four weeks when excessively hot weather, combined with an easing price situation, retarded collections considerably. Much depends, trade leaders declare, upon what happens next to prices. Should they undergo further sharp decline, the prospect for a materially improved flow of tonnage might be jeopardized. It is pointed out that upon a previous occasion, the market dropped to a point where the movement was greatly reduced and that that eventually led to a scramble for steel scrap which brought prices earlier in the summer to an all-

(*Please turn to Page* 147)

## PRODUCTION OF PIG IRON FOR JULY AND YEAR TO DATE

Blast Furnace Capacity and Production—Net Tons — JULY, 1947

| | Number of companies | Annual blast furnace capacity | Production: Pig Iron — Current month | Pig Iron — Year to date | Ferro manganese and spiegel — Current Month | Ferro manganese and spiegel — Year to date | Total — Current month | Total — Year to date | Percent of capacity — Current month | Percent of capacity — Year to date |
|---|---|---|---|---|---|---|---|---|---|---|
| Distribution by Districts: | | | | | | | | | | |
| Eastern | 11 | 12,551,280 | 851,872 | 6,282,073 | 22,509 | 175,069 | 874,381 | 6,457,142 | 82.2 | 88.6 |
| Pittsburgh-Youngstown | 17 | 25,042,040 | 1,729,160 | 13,250,389 | 18,360 | 106,364 | 1,747,520 | 13,356,753 | 82.3 | 91.8 |
| Cleveland-Detroit | 6 | 6,557,500 | 424,550 | 3,434,766 | - | - | 424,550 | 3,434,766 | 76.4 | 90.2 |
| Chicago | 7 | 14,097,710 | 1,033,846 | 7,217,276 | - | - | 1,033,846 | 7,217,276 | 86.5 | 88.1 |
| Southern | 8 | 4,924,670 | 315,041 | 2,262,269 | 12,126 | 66,335 | 327,167 | 2,328,604 | 78.4 | 81.4 |
| Western | 4 | 2,536,000 | 177,150 | 1,264,579 | - | 11,297 | 177,150 | 1,275,876 | 82.4 | 86.6 |
| Total | 37 | 65,709,200 | 4,531,619 | 33,711,352 | 52,995 | 359,065 | 4,584,614 | 34,070,417 | 82.3 | 89.3 |

# New "Super Metals" in Offing, Battelle Director Tells ASME

*Metals and ceramics able to withstand higher stresses and temperatures being developed for use in power plant and propulsion machinery. Sessions in Salt Lake City cover fuel, metals engineering and atomic energy*

DEVELOPMENT of "super metals" to meet the needs of future propulsion and power generation machinery was predicted last week by Clyde E. Williams, director, Battelle Memorial Institute, Columbus, O.

Dr. Williams, widely known for his work in advancing metal and mineral technology for the programs which he directed during the war for the Office of Scientific Research & Development, the War Production Board and the armed services, was the principal speaker at the dinner Sept. 2 highlighting the fall meeting of the American Society of Mechanical Engineers Sept. 1-4 in Salt Lake City, Utah. Co-sponsor of the dinner was the American Institute of Mining & Metallurgical Engineers, of which he is president.

### Develop New Forms of Power

New and revolutionary forms of power generation and transportation are being developed by the Army and Navy, Dr. Williams disclosed, which will require stronger and more heat-resistant materials. The gas turbine, which has been made possible only by use of highly alloyed materials produced in the last five or ten years, requires materials able to withstand high stresses and temperatures up to 1500 degrees F, he said, adding: "Now engineers are pushing upward beyond this figure and are asking for materials to withstand 1600 degrees F and stresses as high as 20,000 psi."

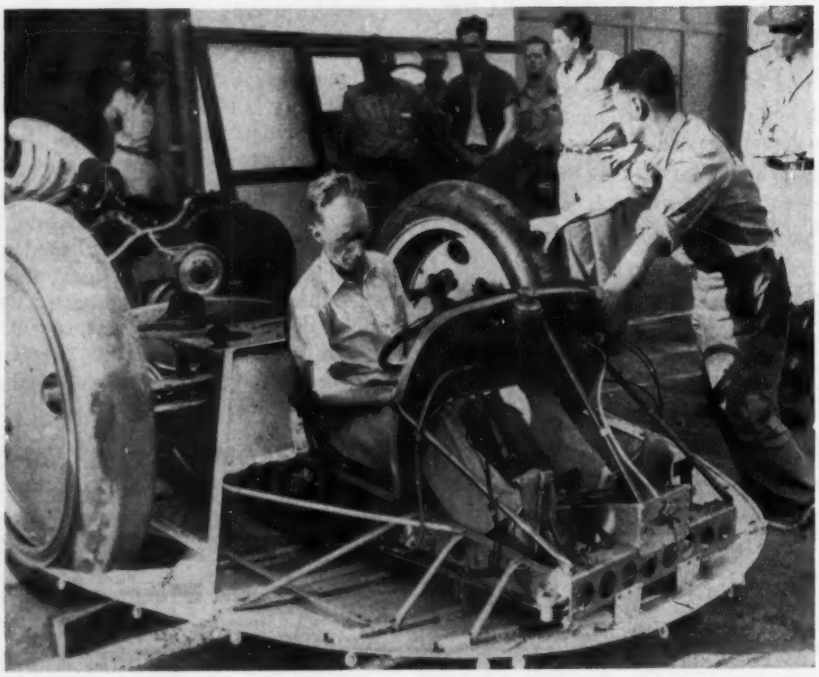
Citing examples of new metals which were introduced to meet war demands for superchargers and gas turbines for combat aircraft, he explained that supercharger "disc materials must withstand a temperature of 1100 degrees F under high stress. For this purpose, chromium-nickel-cobalt-iron alloy strengthened with such other elements as molybdenum, tungsten, columbium or titanium is used. The gas turbine blades used in superchargers and jet engines are subjected to temperatures of 1500 to 1600 degrees F and the metal sometimes reaches a temperature of 1500 degrees F. The strongest materials suitable for precision casting are the cobalt-base alloys containing 40 to 70 per cent cobalt and such other additions as chromium and molybdenum or chromium, nickel, molybdenum, tungsten and columbium."

Showing promise for use under higher stresses and temperatures, Dr. Williams said, is another series of alloys based on percentages higher than 50 per cent of chromium. In preliminary tests, such an alloy containing 60 per cent chromium, 15 to 25 per cent molybdenum and the balance iron, melted and cast in a vacuum, "shows up better than the cobalt-base alloys and gives promise of permitting safe use of still higher stresses. There is much hope also that other alloys will be forthcoming that will have better properties than the present ones," he declared.

"These high-temperature 'super metals' developed for the gas turbines and improvements on these yet to come will be useful, but to meet the highest temperatures these will not suffice and ceramic materials will be called for," he predicted. "These ceramic materials made up from the most highly refractory substances such as oxides of beryllium, aluminum, magnesium, zirconium, etc., are the only known materials that will not melt or burn up at such temperatures. They may be used as coatings for metals, as structural combinations with metals, or as individual parts. One difficulty involving the use of ceramic materials is their relatively poor mechanical properties compared with metals. These must be improved or compensated for by design. Such materials, because of the high degree of useful work they will perform and owing to their unusual properties, may command a high unit price compared with customary constructional materials."

Discussing future power sources in his address, Dr. Williams said the gas turbine has met with so much success in aircraft that it will be extended to numerous other fields. Units of this type for ship propulsion are now under construction for the Navy and the Maritime Commission, he stated, and stationary power generation units to be run by 5000-10,000 hp gas turbines are in the planning stage. Gas turbines that will use coal instead of oil as fuel to power locomotives are being developed by a group of railroads and coal companies, and this type of propulsion, he said, can be expected to compete with the diesel in railway transportation. The possibility of utilizing small gas turbines in place of larger piston engines for the larger trucks and busses is also being studied, he told the gathering.

Rocket propulsion and atomic energy utilization will also need new metals to



**SPEEDSTER:** Deep in thought over one of the many problems attendant to obtaining speeds up to 400 mph is Reid Railton, seated in the high-speed Railton Mobil Special which he designed. The car is pictured without its one-piece, streamlined shell as it gets a working over at a garage near the Bonneville, Utah, salt flats, but the shell is on when the car is racing. NEA photo

achieve more complete usefulness, he declared. Success of rocket and atomic energy space ships, which are now in the realm of "interesting speculation," Dr. Williams said, will depend on finding "materials of construction to withstand temperatures hitherto considered beyond the range of engineering materials."

Most of the railroad rails of the future will have a new shape, Walter Leaf, research technician, Denver & Rio Grande Western Railroad, told delegates to the ASME meeting at a metals engineering session. At the same session the greater abrasive resistant qualities of alloy white cast iron as compared with unalloyed and with various abrasive resistant steels were discussed, and tests of the alloy white iron in actual use were described by Kenneth A. DeLonge of the Development & Research Division, International Nickel Co.

The new rails, which were developed after failures of the middle section or web of several 112-lb rails were discovered in 1940, have been approved by the Rail Committee of the American Railway Engineering Association, and "at the present time, most rail mills have made or are making rolls to produce the improved sections," Mr. Leaf said. The new rails, now in use on 20 miles of Denver & Rio Grande track, are 114-lb sections with the web inverted and thickened, the lower portion of the web thinner than the upper portion.

**Discusses Metallurgical Tests**

Mr. Delonge's discussion of the tests conducted on martensitic white iron, produced by addition of 4½ per cent nickel and 2 per cent chromium to white cast iron, revealed that the alloy gives a service performance usually two to three times that of unalloyed white iron when impact is not a factor and it shows 25 to 200 per cent greater life than various abrasion resistant steels.

Speaking on "Atomic Energy, Its Uses and Abuses," Robert Sibley, University of California lecturer and former ASME vice president, described the operation of the university's 4000-ton cyclotron and urged international control of atomic energy under a plan for the full and complete harmonization of efforts to control its uses for the good of mankind.

John K. Northrop, president of Northrop Aircraft Inc., Hawthorne, Calif., was presented with ASME's highest aviation award, the Spirit of St. Louis Medal, at the banquet session at which Mr. Sibley spoke. The award was made in recognition of Mr. Northrop's "originality and vision in the engineering of military and commercial airplanes, and particularly for his development of a successful flying wing."

Smoke abatement efforts and achievement of greater efficiency in burning Utah coal in industrial plants was outlined by J. D. Heath, fuel engineer, Utah Coal Operators Association, at the society's fuel session. Otto de Lorenzi, Combustion Engineering Co., showed motion pictures illustrating operation of continuous-discharge spread stokers.

Keynote address to the meeting was delivered by ASME President Eugene W. O'Brien who traced the comparatively recent growth of the South and the West, and said this industrial growth should logically continue.

## High Tax Rates Constitute Communism, HPM Head Says

High taxes constitute communism, H. A. Toulmin Jr., president of the Hydraulic Press Mfg. Co., Mt. Gilead, O., declares in the August issue of *Press Proofs*, a publication issued by his company.

"I have been paying up to 97 per cent in taxes. If that is not communism by appropriation of private property, I would like to know what it is," he writes. "Tax reduction is not a political issue; it is a matter of life and death for free enterprise and the capitalistic system. To maintain that we can continue to tax income at the rates of 1946 and 1947 and keep a healthy economy in this country is just plain silly.

"Big incomes provide the extra money that is needed now for investment to provide jobs for lower income groups. Unless business can continue to expand through the addition of new investments from the savings of the people, there will not be jobs enough for all in this nation with its growing population," Mr. Toulmin declared.

The August booklet also contains a chart contrasting the sharp increase of wage costs with a relatively level line of man-hour production.

## New Company To Handle Phoenix Iron Subsidiaries

As result of the recent absorption of the plant and inventories of the Phoenix Iron Co. and its subsidiary, Phoenix Bridge Co., Phoenixville, Pa., by the Phoenix-Apollo Steel Co., a new company will be organized to continue control of the Virginia Metal Products Co., Orange, Va., and the Lake City Malleable Co., Cleveland, and other assets owned by Phoenix Iron Co., but not affected by the merger. No change in management of either the Orange or Cleveland concerns is contemplated.

Plans are going ahead at Phoenixville for the production of sheet bars for shipment to Apollo, Pa., with the possibility that rolling of these products will be started in October. Some new cranes and other equipment are expected to be added to the plant.

# Pipeline Steel Needs Expected To Rise in West

***Large tonnage demand thought likely as steps are taken to overcome threatened gas and oil shortages***

*SAN FRANCISCO*

ONE OF the Far West's major outlets for steel is scheduled to expand sharply during the next year or two. Thousands of tons of steel will be rolled into large diameter pipelines to carry natural gas to California from fields in mountain states.

And this gas, in turn, will provide California industries with an increased amount of fuel so that they, too, will be able to expand operations and thus consume larger quantities of steel.

Late this year a 1000-mile pipeline will be put into operation between west Texas and southern California. The 30-in. and 26-in. pipe for this project was fabricated by Consolidated Steel Corp. from plates produced by the Geneva Steel Co. in Utah. This line will help alleviate a shortage of natural gas which has curtailed operations of many California industries recently.

Plans are being completed for laying an additional pipeline westward from New Mexico to the Pacific Coast. Maximum diameter of this line would be 26 inches, and it is likely to parallel the line now being built.

**Plan Line from Wyoming**

On top of these projects, other plans are in a preliminary stage for construction of an 800-mile line from a newly discovered gas field in Wyoming to northern California.

Total cost of all three pipelines has not been computed, but it is expected the aggregate would exceed $150 million, and perhaps be as high as $175 million.

California's fuel predicament is the result of a dwindling supply of natural gas from its own fields, as well as a greatly increased demand. Geological surveys indicate only a remote possibility of discovering new gas fields in the state, and thus California eventually may have to depend on imports of gas for industrial and residential fuel.

A similar situation exists in petroleum. No large new discoveries of oil wells have been made in California in the last 10 years. Wartime demand for gas and oil depleted underground supplies of both fuels sharply, with the result the need for imports was advanced by several years.

# Await New Plan To Refinance Fontana Debt

***Western industry expects Kaiser to make new move to put steel plant on sound basis. May seek private refinancing***

*SAN FRANCISCO*

WESTERN industrialists are closely watching for Henry Kaiser's next move in his campaign to place his Fontana steelworks on a sound financial footing.

Since the Reconstruction Finance Corp. recently turned down his request to reduce the government debt on the plant, which request was supported by many western business interests, there has been much speculation as to just what Kaiser now will do, but so far nothing definite as to his plans has been hinted by the industrialist.

There has been considerable discussion as to whether Kaiser will resort to sale of securities to raise sufficient funds to liquidate the RFC obligation. Several weeks ago he indicated that such a course had been studied, and events of recent days have given further impetus to such a proposal. For example:

In the RFC letter rejecting the Kaiser request for a reduction of the loan there appeared this statement: "What is needed is sufficient private capital to liquidate the government investment on the basis of the sound value of the Fontana assets."

**Considers Private Financing**

Subsequently, on his return to California, Mr. Kaiser said: "The only sensible thing in the RFC's letter is that part about private financing."

In any event, opinion here is that Kaiser stands no chance whatsoever of obtaining a reduction of the loan from the government. The RFC stated its case bluntly and unequivocably. And the possibility that Congress will intercede is believed to be highly improbable.

Kaiser is no darling of the Republican party, and the Republicans in control of Congress would not hesitate to block any movement to forgive any part of the Kaiser debt.

Mr. Kaiser, on his return to headquarters here from Washington, was bitterly critical of the RFC decision.

"I think the teams are just lining up. This is the kick-off," he said. "When a thing isn't right, the fight is never over."

Referring to U. S. Steel Corp.'s purchase of Geneva steel mill from the government, Mr. Kaiser said: "What the RFC has done is to hand U. S. Steel a $160 million subsidy."

Mr. Kaiser said that he had wired Senators Ferguson and Brewster, of the Senate committee investigating war contracts, urging them to begin a steel investigation. Neither had replied to Mr. Kaiser, but he said "I don't think they can stop it (the investigation)."

Mr. Kaiser would make no statements regarding his immediate plans on the Fontana debt situation. "I'll meet with the Western States Council as soon as we can get together," he said. The Western States Council, composed of representatives of chambers of commerce in the 11 western states, actively sought RFC approval of a loan writedown for Fontana.

Regarding the RFC action, Mr. Kaiser said:

"The $85 million reduction in the Fontana loan would have been passed along to the public, our employees and to our customers. I can sell all the steel I can now make at any price I want to ask, but I would pass the loan savings on to the customers."

Meanwhile, the Fontana mill in southern California continues to produce at capacity levels, according to Kaiser officials. Production now is averaging 64,000 tons of ingots monthly, about 3000 tons more than the best wartime rate. The plant's structural mill is producing 28,000 tons monthly, and the merchant mill about 16,000 tons a month. The remaining 20,000 tons are being produced by the plate mill and in strip and ingots sold directly to buyers and billets sent to the Kaiser-Frazer auto plant.

The plant's facilities are being expanded with construction of a pipe mill and a cold rolling mill for light gauge strip. Both new mills are about 75 per cent completed.

## Plan To Complete Gas Line Installation by Dec. 1

The "biggest inch" gas pipeline from Texas fields to Southern California, slated for completion by Dec. 1, will reach daily capacity of 305 million cubic feet three years ahead of the original 1952 deadline if a proposal by gas companies receives sanction of the state of California.

This was predicted last week by executives of the Southern California Gas Co. and Southern Counties Gas Co. in a petition to the State Board of Public Utilities which seeks permission for the southern companies to sell up to 100 million feet of gas a day to Pacific Gas & Electric Co.

The hearing gained significance from the fact that fuel oil reserves are critically low throughout the Pacific Coast area.

# Operations at Geneva Steel Plant Boosted

***Resumption of idle capacity cheers West Coast steel users plagued by recurrent shortages of needed products***

GENEVA Steel Co., Geneva, Utah, which cut its operations more than 50 per cent during the ten-day period between June 28 and July 8, has regained the rate of production prevailing before the slowdown. The plant's three blast furnaces and eight of its nine open hearths are now in operation. The plate mill is rolling at the rate of 14 shifts weekly, while the structural mill is operating ten shifts a week.

Geneva's resumption is good news to West Coast steel users plagued with recurrent steel shortages.

Progress is being made toward settlement of another question of wide importance to West Coast steel users. That is a decision on whether reduced rail rates on steel from Geneva to the West Coast shall be made permanent.

Parties concerned in hearings before the Interstate Commerce Commission have been asked to present their arguments to the ICC in written form by Oct. 15. These parties are five major railroads which granted lower rates to the steel company, and supporting interests such as consumers of steel and chambers of commerce.

Steel companies which are protesting the rate cut, notably the Kaiser Co., must present their evidence and exhibits to the ICC on or before Nov. 15. Actual hearing on the testimony will be held in San Francisco about Dec. 15.

## Consolidated Stockholders Approve Sale to U.S. Steel

Stockholders of Consolidated Steel Corp., Los Angeles, at their annual meeting approved the resolution stipulating the agreement for sale of the business and assets to the Columbia Steel Co., U. S. Steel subsidiary. The vote was 411,851 for and 4294 against.

Consummation of the sale depends largely now on the decision of the U. S. District Court which recently finished hearing a suit brought by the government in which it charged the sale violated the Sherman Act. The court decision is expected in 30 to 60 days.

The company currently has an order backlog of $80 million.

# Approaching Machine Tool Show Attracts Worldwide Attention

***Advance registrations received from all parts of U.S. and Canada and from 30 overseas countries. Visitors will include 40 representatives of British Machine Tool Trade Association. Total attendance expected to reach 100,000***

DISPLAYING of all machines in full operation at the 1947 Machine Tool Show, Sept. 17 to 26, will make it a giant working machine shop which will attract worldwide attention.

Occupying 550,000 sq ft of space at the war-built Dodge-Chicago plant, near the Chicago airport, the show will present more than 2000 of the latest developments in machine tools, forging machines, and other metalworking equipment. Total value of the machinery to be on exhibit will be around $16 million. One machine alone is valued at more than $70,000.

Because of its unprecedented size and the fact it will be the first event of its kind in 12 years, the show has attracted worldwide attention. The National Machine Tool Builders' Association, under whose auspices the show is to be held, anticipates an attendance of approximately 100,000 industrial, financial and engineering executives. Advance registrations have been received from all parts of the United States and Canada and from 30 overseas countries.

**British Delegation Coming**

On Sept. 11, a party of 40 representatives of the British Machine Tool Trade Association will leave England by ship and will arrive just in time for the show's opening. Overseas guests will be honored at a special dinner in the Palmer House ballroom on the evening of Sept. 23. Dr. Brooks Emeny, president of the Foreign Policy Association of New York, will speak on "Tools of Reconstruction."

Admission to the show will be by registration only, and the majority of visitors will register on arrival. To provide transportation for show visitors, a fleet of 150 special busses will ply between downtown Chicago and the plant.

Setting up such a large show of this type is a formidable task, for the tools on exhibit are heavy machines built for permanent installation, not machines that may be rolled into place. One machine alone is 13 by 10 by 10 ft in size, weighs 115,000 lb and has 32 motors. Another towers above the ceiling light fixtures. Hundreds of trucks, tractors and trailers, and more than 50 pieces of big special-purpose material handling equipment are being utilized for the "set-up" job.

Providing electricity for the show is a huge undertaking, for the machines on display will have 5000 motors with a total of 15,000 hp while ceiling lights and special exhibit and machine lights will require a million watts.

To facilitate removal of equipment at the close of the show, machinery crates are stored in a 20-acre plot that duplicates the floor arrangement of the show. In that crate storage area each exhibitor is assigned the same relative space he will use in the show.

## Foresees New Controls for Improving Machine Tools

Many opportunities for improving present machine tools through better control devices and the use of electron tubes are seen by George Connor, sales manager of the Electronics Division in Boston of Sylvania Electric Products Inc.

Recently Sylvania in co-operation with Bryant Chucking Grinder Co., Springfield, Vt., developed a motor and motor-control system which it is said makes possible a more efficient machine tool for grinding and polishing products to a high degree of perfection.

## Reports Improved Supply In Construction Materials

Supply of most construction materials continued to improve during the first half of 1947, mainly because of high production levels, the Department of Commerce reported recently.

Among the larger advances registered were cast iron soil pipe and fittings, concrete reinforcing bars, wire nails and staples, cast iron radiation, rigid steel conduit and fittings, warm air furnaces and water heaters.

## To Show Machines at Chicago

Motch & Merryweather Machinery Co., Cleveland, will show its line of metal cut-off machines in the demonstration rooms of its Chicago representative, Bryant Machinery & Engineering Co., 650 West Washington Boulevard, Chicago, Sept. 15 through Sept. 30. In an advertisement on page 270 of STEEL for Sept. 1, the address was incorrectly given as 6500 West Washington Boulevard.

MOTOR PRODUCTION BEGINS: The new Ashtabula, O., plant of Reliance Electric & Engineering Co., Cleveland, has begun producing 1 to 15 hp electric motors and V-S drives. For a time, motor output will be on a small scale, with full production from two shifts to be reached within 90 days. Packing for shipment the first motors to be made at the new plant is J. W. Corey, company president, while F. E. Harrell, manufacturing vice president, Karl H. Meyer, Ashtabula plant manager, and R. H. Smith, company secretary, look on

# Windows of Washington

*British technological obsolescence cited in support of recommendations for national science program. American strength heretofore has been in application of scientific principles, not original discoveries but now we are on our own*

JOHN R. STEELMAN, as chairman of the Scientific Research Board which has just recommended to the President a long-term national science program, drew on the present plight of England to bolster his recommendations.

Pointing out that, "Today, one of the most serious long-term problems still facing the British government is the modernization of industrial facilities," he said:

"Since the turn of the century, the British have been paying, in terms of technological obsolescence, the penalty for their early industrial leadership.

"Particularly in the basic industries, British facilities and technology were older and less efficient than their German counterparts. The balance of power in Europe was upset primarily as a result of this fact, and the world was plunged into two devastating wars."

There is no immediate prospect, Mr. Steelman reports, that we in this country shall fall technologically behind.

"Our technology is sufficiently advanced and our resources sufficiently adequate," he feels, to safeguard us in the immediate future. However, he warned, "We shall in the future, have to rely largely upon our own efforts in the basic sciences to provide the basis for that improvement.

"The danger lies in the future."

### Have Relied on Application

He made a point not generally considered in this country—"As a people, our strength has lain in practical application of scientific principles, rather than in original discoveries."

We have imported our theory from elsewhere, and translated it for application to concrete and immediate problems. Such was the story of the atom bomb; "the basic discovery," Mr. Steelman reminded, "of nuclear fission was made by Otto Hahn and F. Strassman in Germany, founded on preliminary research in Italy, and published in a German periodical in January, 1939, just before the laboratories of Europe went dark."

That situation, he feels won't repeat itself. Some European laboratories have been darkened by the war indefinitely, and others are behind "The Curtain."

From here out, says Mr. Steelman, "we are on our own as far as extension of knowledge is concerned."

One aspect of the report is its apparent re-entry into the field of government-dominated science, fear of which was an obstacle in the course of the national science legislation of the past two congressional sessions. This may be a far-fetched interpretation.

As a typical field of application of the new research, the report cites military aviation. By the end of the war, it is pointed out, advanced military aircraft were approaching the speed of sound, and above that range "the entire body of theory with respect to the flow of air over surfaces breaks down."

"A staggering array of basic research problems must be solved and a new body of theory developed if planes are to be engineered to fly faster than the speed of sound," Mr. Steelman observed.

Industrially and scientifically, meanwhile, he sees this country facing severe competition. He points to the Soviet Union's 1947 budget, said to contain $1.2 billion for research and development, as compared with $900 million in 1946, and a sort of 5-year plan for mass-producing 140,000 scientists and engineers each year.

It might be a fair comment that perhaps the Soviet needs this huge sum, and this concentration of training, to overtake a head start in technologically and otherwise more advanced nations. However, the report cites the recent recommendations of the British "Barlow Committee" for a program aimed at doubling the annual increment of scientists in Britain.

Industrially, the Steelman report pointed out that the destruction wreaked in the war makes it inevitable that much of Europe, in rebuilding its factories, will soon possess an industrial plant more modern than ours today.

The fundamental recommendation of the Steelman report was for a gradually evolving research program to the point where in ten years, "we should be devoting at least 1 per cent of our national income to research and development in the universities, industry and the government."

Other recommendations put an emphasis on government support of such a program, which the President echoed in his statement announcing the report.

Some recommendations were: Federal government support for research in universities and nonprofit institutions at a progressively increasing rate; federal assistance to undergraduate and graduate students in the sciences; federal assistance to universities and colleges in establishment of laboratories and scientific equipment, and establishmennt of a national Science Foundation to make grants in support of basic research.

The President emphasized these recommendations, with particular reference to establishment of a National Science Foundation. He also said he would shortly name a permanent committee of government officials to aid in working up government scientific programs.

WILLIAM CLAYTON

*Mr. Clayton, U. S. Undersecretary of State for Economic Affairs, steps from an airplane at London for financial talks with Sir Stafford Cripps, president of the Board of Trade. Discussion topics were expected to include cutting of Britain's tariffs and elimination of some forms of imperial preference. NEA photo*

## Steel Hearing To Resume

Steel subcommittee of the Senate Small Business Committee resumes its investigation of the steel shortage Sept. 11 when Philip Murray, CIO president, testifies before the group. The following day the subcommittee, which is headed by Senator Edward Martin (Rep., Pa.), will meet with chief executives of the leading steel producing companies.

Shortly after this meeting with the steel executives the committee is expected to issue its report about which there is considerable speculation. In informed circles it is said the subcommittee prob-

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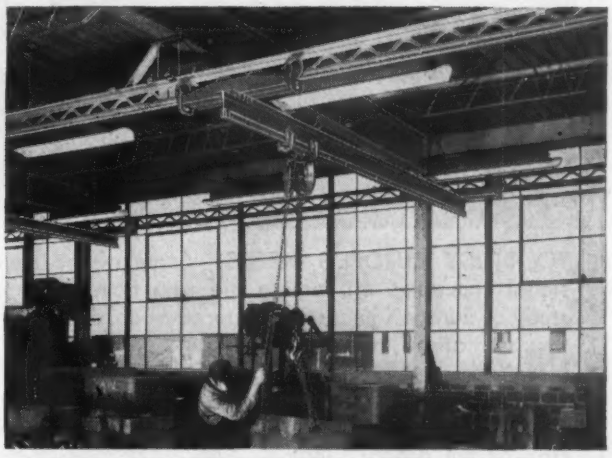

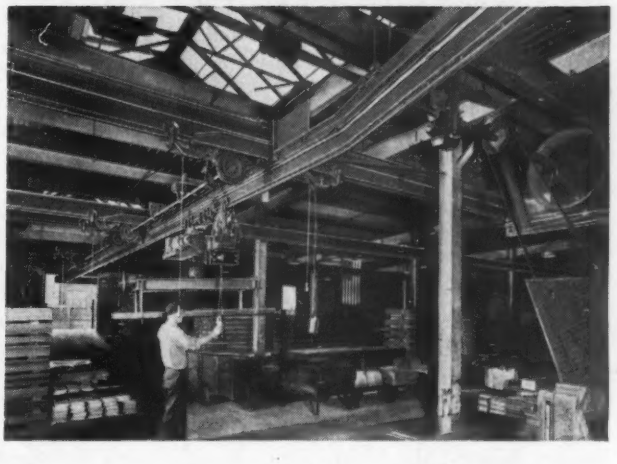

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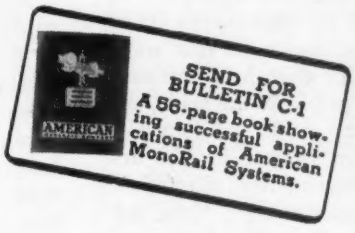


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TO STUDY EUROPE'S NEEDS: Some of the members of the congressional committee on foreign aid who have gone abroad for a month's study of Europe's needs are pictured aboard ship: Front, left to right, are: Representatives Francis E. Walter, Pennsylvania; W. Kingsland Macy, New York; John M. Vorys, Ohio; and James P. Richards, South Carolina. Standing, left to right: Representatives Eugene J. Keogh, New York; Overton Brooks, Louisiana; Christian A. Herter, Massachusetts, vice chairman of the group; John C. Kunkel, Pennsylvania; Thomas A. Jenkins, Ohio; and Edward E. Cox, Georgia. NEA photo

ably will recommend an expansion of at least 10 million tons a year in the nation's steel ingot capacity. It is said the committee's research staff is convinced that steel capacity must be expanded to a bare minimum of 100 million tons annually; that only through such expansion can the current steel shortage be met. Some committee experts are reported of the opinion that the expansion should be even beyond 100 million tons.

## Surplus Pipe Made Available

Additional war surplus steel pipe is being made available for farms, ranch wells, and watering systems of the Midwest, through War Assets Administration sales, Senator Kenneth Wherry and Senator Edward Martin said here last week, following action by the senators' two committees in the matter.

Senator Martin heads a Senate committee investigating steel shortages, and Senator Wherry, the Senate Small Business Committee of which the Martin group is a part.

Approximately 5000 tons of steel pipe are being released from government surplus and lend-lease stockpiles, it was stated, while an additional 275,000 feet of pipe have been located by Senator Wherry's committee in lend-lease storage, largely around New York, and which has been held by the government since December, 1946, for shipment to Russia under an expired lend-lease law.

## Government Procurement

With a view to aiding small businesses in becoming a government supplier, the Department of Commerce states its 46 field offices now can provide information sought by small companies seeking to sell supplies to government agencies. J. L. Kelly, director of the department's Office of Small Business, points out that applicants can now learn what the government is buying, where purchases are made, and how the contracts are let. Information has been brought together for the first time on procurement by all federal agencies, including the Army, Navy, Agriculture, Interior, Commerce, Justice and Post Office Departments and the Treasury's Bureau of Federal Supply.

## Railroad Tariffs Rising

Freight and passenger railroad tariffs abroad are following the general inflationary pattern, the Office of International Trade, Department of Commerce, reports. Since January, 1947, railroad tariffs have been raised in many countries, including Great Britain, France, Finland, Spain, Turkey, Cuba, Colombia, Mexico, Costa Rica, Brazil, Peru, Chile, Bolivia, China, French Indo China and Japan. In other countries increased rates are expected to be authorized soon. In Canada, a decision will be made soon on the application of railroads for a 30 per cent increase in freight rates. In Argentina there are indications that tariff boosts are in the offing.

In some countries, such as France, Finland, Turkey, Japan, Cuba and Mexico, almost all lines have been affected. In most others the increased rates apply only to some lines or only to selected commodity classes.

Aside from climbing costs of materials, equipment, supplies and labor, another contributing factor to the general situation is the need of railroads, particularly in war-devastated areas, for higher profits so that they can afford to replace equipment. The problems of freight car shortages and deferred maintenance are causing hardships not only in Europe, but all over the world.

## Trade Practice Conferences

In view of recent complaints of monopoly, price fixing and anti-trust law violations instituted against various industries, including steel, by the Department of Justice and the Federal Trade Commission, industrialists and trade association executives are deeply interested in a recent statement of policy on fair trade practice conferences by the Federal Trade Commission in which the government agency takes a stronger stand on alleged violations of the various federal laws.

Trade practice conferences have no force in law in themselves, the FTC pointed out. The commission stated it will employ conference procedure when it appears questionable practices are so prevalent in an industry that they may be more effectively reached by that method. On the other hand, the commission added:

"But it is not the policy of the commission to grant the privilege of settling cases through trade practice conferences or stipulation agreements to persons who have violated the law where such violations involve intent to defraud or mislead; false advertisements of foods, drugs, devices or cosmetics which are inherently dangerous or where injury is probable; suppression or restraint of competition through conspiracy or monopolistic practices, or violations of the Clayton Act. Nor will the privilege be granted where the commission is of the opinion that such procedure will not be effective in preventing continued use of the unlawful methods, acts or practices."

# Tug-of-War Seen In Making Over New Labor Law

***National Labor Relations Board appears in "sweatbox" in administering Taft-Hartley Act due to conflicting views***

*WASHINGTON*

THE National Labor Relations Board last week appeared heading rapidly toward a tug-of-war between congressional and administration views as to enforcement of the Taft-Hartley Law.

Developments were these: Major AFL and CIO organizations up to this writing were threatening to ignore the board's warning notice to file affidavits certifying the non-communist character of leadership, and other registration data. To date, they have not actually said they would refuse to send in the affidavits, but what were virtually official pronouncements were calculated to leave the board in doubt.

John L. Lewis' *United Mine Workers' Journal* openly recommended that organized labor refuse to accept the Taft-Hartley Law at all, and meanwhile, work for its repeal. Lewis had not said whether he would or would not comply with affidavit requirements. However, if he took adverse action, it would mean automatically, that all AFL unions with which the mine workers are affiliated, would be outside the fold of NLRB.

### AFL Weighs Requirements

In similar round-about fashion, the AFL weekly news bulletin said the Executive Council, which met in Chicago last week, was weighing the requirements very carefully, and this source likewise omitted to say in advance that the group would comply with the law.

Whether this was mere truculence, in line with organized labor opposition to the law all along, remains to be seen. But there was no doubting the belligerent reaction of Representative Fred Hartley, co-author of the law. Recalling that 195 cases involving allegations of unfair labor practices by employers were at the final stage of board decision, he made a formal demand that the board immediately throw out the entire docket, unless the anti-communist affidavits were sent in, in response to the board's notice to the unions that it would enforce this prerequisite. He extended the demand to all 3000 cases at various stages of progress before local board offices.

The board in effect had threatened the same thing in its first notice to unions to file the affidavits. However, the 20-day deadline was apparently widely misunderstood to mean that the unions had until Sept. 9. Counsel for the board has explained that the 20-day limit started for each union only from date of the notice to that particular organization.

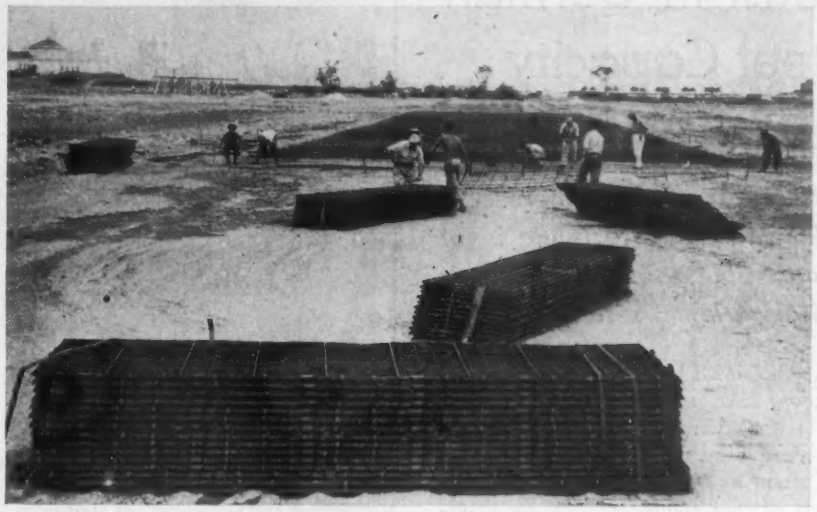
This was clearly stated in the original announcement, but the time limit was almost immediately seized on by hostile union spokesmen, as a ground for protesting the whole procedure.

The NLRB is wedged into a sweatbox on the issue in any event. If the President has been correctly reported, he has told the board to answer to him in its administration of the law, and not to Congress. By implication, he can send their nominations for confirmation at the January session or not, according to his verdict on the individual board members.

On the other hand, Congress can confirm or reject the nominations according to its own views of the board's zeal.

As for Congressman Hartley, he will be in the next session, but he doesn't have to worry politically—he reminded newsmen last week that he planned to step out after this next session, and furthermore, he added, he has had the plan all along, and has said so.

Politically, there were growing signs that major labor organizations were basing their current position on Taft-Hartley, on a plan to knock the law out, and meanwhile, to center a political battle on its supporters that would weaken its force until it is repealed.



**PAVED WITH METAL: A temporary metal landing strip, reminiscent of wartime installations, is being laid on Chicago's Northerly island, new lake-front airport. Later this portion of the field will be used as a taxi strip. NEA photo**

## Drop in Housing Costs Held Dependent on Labor Costs

Edward R. Carr, president, National Association of Home Builders, said recently in Los Angeles the cost of new housing will not go down unless the cost of labor decreases. He pointed out that after World War I there was a drop in building material prices of 58 per cent between February, 1920, and May, 1921, but said a similar decrease cannot take place now due mainly to the demands of organized labor.

Labor costs represent an estimated 80 per cent of total home cost, he said.

## Ship $7 Million Worth of Porcelain Enameled Goods

More than $7 million worth of porcelain enameled products were shipped during June, Porcelain Enamel Institute, Washington, reports.

This figure represents an increase of about $2 million over the shipment value of June, 1946, and an increase of more than $4 million over the value for June, 1945, according to the institute statement. June shipments were approximately $450,000 less than shipments reported for May of this year.

## Gas Ranges Made in Half Year Total 1,166,000 Units

Gas ranges produced and shipped during the first six months of 1947 totaled 1,166,000 units, an increase of 40.6 per cent over the 829,300 units shipped during the corresponding period of 1946, the Gas Appliance Manufacturers Association reports.

The industry's 1947 gas range production is 10,600 units under its peak year of 1941, when 1,176,600 gas ranges were shipped during the first six months.

# Boost in German Steel Capacity To Be Allowed

***Anglo-American conferees in London agree to lifting ingot capacity to 10,700,000 tons from original security limit***

ANGLO-AMERICAN conferees in London have agreed upon a German steel capacity of 10,700,000 ingot tons per year, as compared with a previous restriction to 7,500,000 tons, under a revision of the limits of German industrial capacity to provide for a general level approximately that of 1936.

The revision was voted over protest of French representatives. The latter have been reassured meantime, that the program still contemplates earmarking of specific plants for dismantling and removal as reparations, and of certain other concessions, as far as practicable.

Announcement of the revision was made simultaneously in Washington and abroad.

**Retention of Capacity Intended**

The statement made clear that what was intended was retention of capacity, as distinguished from production. Production would be governed by availability of fuel and other factors. With reference to steel, the American-United Kingdom representatives stated:

"Under the March, 1946, level of industry plan, steel capacity for all of Germany is limited to 7,500,000 tons, with actual production in any single year not to exceed 5,800,000 tons. Careful calculations show that this level would be clearly insufficient even to support the level of industry contemplated in the original plan, and it is far too low to provide for the needs of the economy under the revised plan."

No reference is made to the Russian zone. Close reading of the announcement indicates, however, that loss of production in the Soviet-occupied area, so far as the other zones of Germany are affected, must have been an important consideration in the changed restrictions.

The nearest to this situation the delegations came was their statement, in reference to increased overall industry, that, "Since trade between the bi-zonal area and the rest of Germany is subject to greater uncertainty than former internal trade, the result may be to increase still further the need for trade with other countries."

In this light, it was considered that the German United Kingdom-American zones would need to export to other countries 15 per cent more by volume, than in 1936. This is calculated to bring in about $2 billion a year, and to this extent, U. S. and British tax-payers would be relieved proportionately.

Grouping heavy and light machinery capacity to be retained, the revised program gives Germany 105 per cent of prewar production, but allows for 35 per cent of present heavy machine capacity to be removed as reparations, and 23 per cent of light, for the same purpose. The former plan, however, earmarked 60 and 33 per cent.

Last week the United States firmly rejected a protest from Russia against the British-American decision to step up the level of industry in their occupied zones of Germany. A note delivered to the Russian embassy in Washington said the U. S. government feels justified in pursuing objectives which have been commonly agreed upon for making arrangements to up German production with any other occupying power willing to work toward the common end.

Russia had protested that the Anglo-American agreement to raise German industrial output in their merged zones to approximately the 1936 standard was in violation of the Potsdam agreement which pledged the Big Four to treat Germany as a single economic unit. Refuting this contention, the American note charged the Russian government with failure to carry out the Potsdam pact.

**RUSSIAN GIANT: This new model excavator being built at the Urals Engineering Works in Russia has a higher productive capacity but lower weight than types manufactured at the plant before the war. Destined for rock work, the E-3 excavator will be powered by electricity from a hydroelectric system. Sovfoto**

## Say German Railway Repair Methods Were Good in War

German railway maintenance methods used during the war were uniformly good, although expensive, investigators have reported in Washington, adding that no marked advances were noted.

Because of the wartime steel shortage, standards for perishable wear on rails before replacement were lowered. The Germans re-used rails taken from first and second class lines.

# Belgium Gets First Shipment of Russian Manganese Since the War

***Steel ingot production in Belgium during July sets postwar record. Pig iron scarce. Czech government expecting Russian commercial treaty. First French locomotive since end of war turned out. British steel nationalization still up in air***

TONNAGE of Russian manganese ore is reported to have been delivered at the port of Ghent, Belgium, the first supply of manganese ore from Russia since the war ended.

There is a scarcity of pig iron in Belgium, particularly in regard to foundry pig iron, and restrictions have been placed on exports.

The output of steel ingots in Belgium during July was a postwar record, and reached 239,000 metric tons as compared with 229,000 tons in June.

## Czechoslovakia

A delegation from the Czech government visited Moscow recently, and it is expected that as a result a 5-year commercial agreement will be arranged, by which Russia will export iron, manganese and chromium ore and ferroalloys to Czechoslovakia, while the Czechs will export locomotives, rails and railroad equipment, machinery, electric motors and excavators to Russia.

Output of pig iron in Czechoslovakia during July was 120,500 metric tons, compared with 123,200 tons in June. Output of steel ingots and castings was 166,800 tons against 186,000 tons in June.

## France

From a statement before the French Chamber of Deputies subsidies to the French steel industry prior to Feb. 28 amounted to 4800 frs ($40) per ton, and since Feb. 28 amounted to 3000 frs ($25) per ton, following the increase of prices that was authorized as from Mar. 1.

No mention is made whether the subsidy applies to ingots, semifinished steel or finished products, but it has been calculated on the basis of merchant bars. If no subsidy had been granted, the price of merchant bars in the home market would have been raised from 8020 frs ($66.83) to 11,550 frs. ($96.25).

A commercial agreement concluded with the Belgo-Luxemburg Union provides for exports of iron and steel products, building materials and nonferrous metals to France, against mechanical and electrical equipment and automobiles to be exported from France to the Union.

A 5-year trade agreement has been concluded with Argentina which will supply agricultural products and meat to France against metallurgical and engineering products, precision instruments and automobiles.

At the Forges d'Audincourt, part of the modernizing plan, which is to cost about 200 million frs. ($1,666,666) covers the construction of a sheet mill ordered in the United States. The first portion of this equipment is reported shipped from New York, and is expected to be completed by the end of the year.

At the Societe Metallurgique de Knutange, the modernization program will cost 400 million frs. ($3,333,333) and covers installation of a complete turbo-alternator plant and ore preparation plant.

The first locomotive made in France since the war has come out of the Ateliers Franco-Belge at Raismes. This locomotive is of 3200 horsepower, and can pull an express train at 130 km per hour (81 mph). It took 18 months to build, and represents the commencement of a program covering 307 locomotives, including 200 of the type mentioned.

At the state-owned Renault works, output in June was 100 private cars, of which 95 were exported; 118 commercial vehicles, of which 70 were exported, and 12 agricultural tractors. The present plan is to improve production by standardization of parts, and to produce only one model of private car (the Juva-quatre) and five commercials ranging from a 300 kg delivery van to seven-ton lorries, and also agricultural tractors.

## Great Britain

Until recently the question of the nationalization of the iron and steel industry seemed to have been placed in cold storage, but at the time when the full gravity of the economic crisis in Great Britain became apparent, influential elements of the T.U.C. have renewed their insistent demand for the nationalization of the industry.

At time of writing there is no indication to show what decision will be made by the cabinet, but it is now to be expected that the question of nationalization of iron and steel may be included in the King's speech at the opening of the next session of Parliament in October. There is ground to believe that the cabinet is divided on this question, and that while certain members are insisting on a full measure of nationalization the more sober elements, including the minister of supply, would be in favor of a limited scheme, possibly in the form of part ownership of the larger concerns by the purchase of shares by the government. The uncertainty of the situation is disturbing to the industry, and while a large measure of the program of reconstruction and modernization is proceeding, it is obviously difficult to find the necessary finance until the position is clarified.

The government's target for production of steel ingots for 1947 was established at 12½ million tons. Total production for the first seven months of the year amounted to 7,040,000 tons.

This expansion will largely depend on securing additional output of pig iron. Two additional blast furnaces came into operation at the beginning of August, and six more furnaces are planned to be blown in before the end of September, two of which are new furnaces of the latest type, forming part of the modernization program. In the last analysis the increase is dependent entirely on getting a sufficient supply of coke, and in view of the present condition of the coal industry a satisfactory outcome is problematical.

## Germany

Iron and steel production during the first half of this year in the British zone of occupied Germany was as follows: Pig iron and ferroalloys 810,151 metric tons as against 1,088,330 tons in the second half of 1946; steel ingots and castings 1,203,786 tons as against 1,308,952; rolled products 904,225 tons as against 1,137,237 tons.

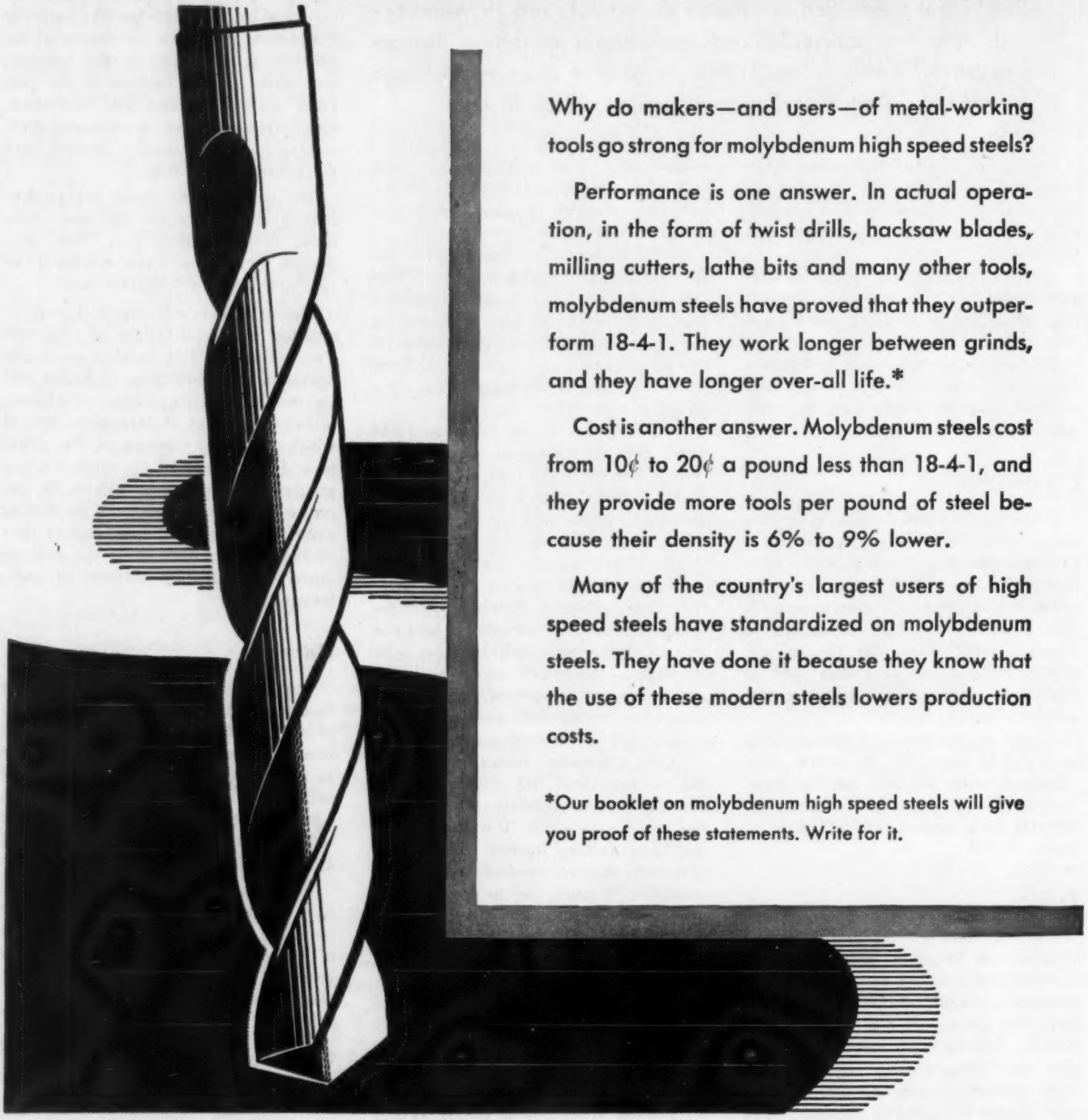
At the end of June, 17 blast furnaces were operating in the British zone, and six in the American zone. The reduction of output during the first half of this year was due to the fuel crisis in the late winter, and transport difficulties.

# General Wage Boost of 11 Per Cent Denied in France

The French cabinet recently declined to accept the agreement achieved between the National Council of French Employers and the General Confederation of Labor which proposed an 11 per cent general wage increase.

A communique issued by the government declared that it was impossible for new salaries to be calculated on a basis other than legal salaries. The communique added that the cabinet was opposed deliberately and completely to any general revision of prices, immediate or otherwise, on the grounds that it would introduce new elements of inflation.

# WHY THE TREND IS TO Mo HIGH SPEED STEELS



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Performance is one answer. In actual operation, in the form of twist drills, hacksaw blades, milling cutters, lathe bits and many other tools, molybdenum steels have proved that they outperform 18-4-1. They work longer between grinds, and they have longer over-all life.*

Cost is another answer. Molybdenum steels cost from 10¢ to 20¢ a pound less than 18-4-1, and they provide more tools per pound of steel because their density is 6% to 9% lower.

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By A. H. ALLEN *Detroit Editor, STEEL*

# Mirrors of Motordom

***Autumn upturn in automobile assemblies to be restricted by flat-rolled steel shortages. Sheet and strip inventories low and deliveries slow. August assemblies lowest since fall of 1946, due to walkouts and materials shortages***

*DETROIT*

AUTO builders' hopes for a sharp increase in assemblies following Labor Day are fading somewhat as the flat-rolled steel supply situation shows little promise of early and substantial improvement.

Output for the week ended Sept. 6 is estimated at 82,000, down from the previous week due to the Labor Day holiday but at an improved daily rate of assemblies. The higher daily rate resulted from resumption of operation at Pontiac and Chevrolet Divisions of General Motors and additional scheduling by Ford.

Preliminary computation of August production figures by *Ward's Automotive Reports* indicates that assemblies in that month hit the lowest point since September of last year and were less than in August, 1946. Total output is calculated at 354,179, compared with 359,111 a year ago. The low production is attributed to low sheet steel inventories and slow deliveries and to numerous walkouts arising from the August heat wave.

**Improvement May Not Materialize**

Expectations a few months ago were that autumn would witness an improvement in sheet steel shipments and a resultant increase in auto assemblies. It now appears this improvement will not materialize and some builders fear September output will show little increase over that of July and August.

The flat-rolled steel scarcity probably will continue to be the No. 1 obstacle to higher output as other limiting factors are diminishing. The supply of pig iron, which was critical earlier this summer, now is reported to be adequate to match steel supplies.

Labor, which has been responsible for numerous shutdowns during the summer, appears more tranquil than at any time for the past several months.

Steel distribution figures compiled by the American Iron & Steel Institute indicate the auto industry is faring slightly better this year than last in the proportion of total finished steel received. For the first four months of 1947, the automotive industry received 14.6 per cent of all steel shipped. This compares with 13.4 per cent of the total received in 1946, but is well below the prewar ratio.

The improved shipments during the first four months permitted production of 423,237 trucks, a record for any four peacetime or wartime months.

In analyzing 1946 steel distribution figures, the institute points out that the auto industry received 6,557,199 tons of finished steel during the year, enough to set a new record in civilian truck production and in the output of replacement parts. Normally, only one-fifth or one-sixth of motor vehicle production consists of trucks, but in 1946 truck production made up almost one-third of the total.

Of the 3,935,111 tons of sheet and strip shipped to the auto industry in 1946, 1,914,694 tons went to independent parts, accessories and supplies manufacturers, 1,697,273 tons went to automobile producers, and 323,144 tons entered into truck production. A good part of the tonnage which went into parts and accessories was shipped later as finished parts to automobile plants for assembling into completed vehicles.

In the first four months of 1947, sheet and strip shipments to the auto industry totaled 1,856,815 tons, of which 694,751 tons went to independent parts, accessories and supplies producers, 1,037,226 tons went to automobile plants and 124,838 tons entered into the production of trucks. The auto industry's share of sheet and strip shipments amounted to 31.3 per cent of total tonnage shipped, as against 27.8 per cent in 1946.

## Automobile Production

**Passenger Cars and Trucks—U. S.**

*Estimates by Ward's Automotive Reports*

| | 1947 | 1946 |
|---|---|---|
| January | 373,872 | 126,082 |
| February | 399,717 | 84,109 |
| March | 441,793 | 140,738 |
| April | 449,388 | 248,108 |
| May | 390,629 | 247,620 |
| June | 418,919 | 216,637 |
| July | 396,932 | 331,100 |
| August | 354,179* | 359,111 |
| September | | 342,969 |
| October | | 410,510 |
| November | | 380,664 |
| December | | 380,908 |
| 12 ms. | | 3,268,456 |

* Preliminary.

**Estimates for week ended:**

| | | |
|---|---|---|
| Aug. 16 | 83,501 | 88,990 |
| Aug. 23 | 84,726 | 91,360 |
| Aug. 30 | 86,958 | 74,960 |
| Sept. 6 | 82,000 | 72,535 |

## $6 Million from Franchises

Tucker Corp. has announced that it has received $6 million for dealer franchises, which, with about $12.5 million received from sale of stock, will give the new car manufacturing company more than the $15 million in working capital needed to qualify as lessee of the Dodge Chicago plant from the War Assets Administration.

Preston Tucker, president, has announced that limited production of the Tucker 1948 passenger car will begin six or seven weeks after successful completion of financing. Mass production is expected to be attained in January and February.

Tucker has not yet signed contracts for steel and other materials, but officials are confident they can obtain them. Mr. Tucker expresses the opinion that the steel shortage will be less acute by the time the company reaches mass production.

## New Car Registrations Rise

New passenger car registrations for July, on the basis of figures from 28 states, should approximate 264,000, according to R. L. Polk Co., Detroit. The first 28 states tabulated for July had a total of 97,929 new cars registered, compared with 63,682 for the same states in July, 1946.

New commercial vehicle registrations from 26 states for July totaled 27,220 units, compared with 20,215 units for the same states and time last year.

Sales of new passenger cars, as reflected by the registration figures, are running about three times the rate of 1946.

## Austin Head Here To Spur Sales

A campaign to sell $15 million worth of British automobiles in the United States in the next year was announced last week by L. P. Lord, chairman of the board of the Austin Motor Co., on his arrival in New York.

"We are out for American dollars," Mr. Lord declared, adding that he would barnstorm the country with four Austins

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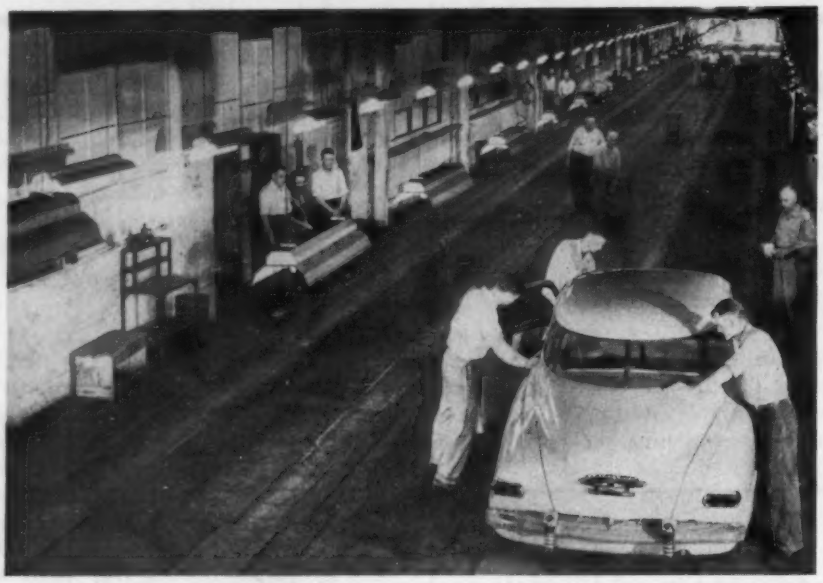


AWAITING ACTIVITY: First car to go onto final inspection line at Studebaker Corp.'s plant, South Bend, Ind., after settlement of a strike against Murray Corp. of America, a supplier of parts to Studebaker, is pictured. Studebaker estimated its three-weeks shutdown for lack of parts cost dealers more than 6000 passenger cars and its employees approximately $1½ million in wages

which he brought with him. He hopes to sign up 1200 American dealers.

Mr. Lord believes American manufacturers have a distinct advantage in the field of cars selling for $1200 to $2500. His small 48-hp models will sell here for $1200. Larger luxury models to sell for more than $2500 will start arriving later this fall, he said.

"Britain must export to pull herself through the dollar crisis, and we are going to do everything possible to help and at the same time fill a genuine need over here," Mr. Lord explained.

## Truckers' Damage Payments Fall

Class I motor carriers paid 10 per cent less to cover cargo loss and damage in 1946 than in 1945, but their payments for cargo insurance amounted to virtually the same percentage of gross revenues in both years.

An analysis by the research department of the American Trucking Associations Inc., Washington, shows the carriers paid 0.95 per cent of their gross revenues for cargo insurance in 1946, compared with 0.96 per cent in 1945.

The analysis was based on figures from 776 common carriers of general freight—those with gross revenue of $100,000 or more per year, as reported to the Interstate Commerce Commission.

The carriers' reports showed they had aggregate gross revenues of $546,219,228 in 1946, out of which they paid $5,178,773 for cargo insurance. The same carriers made cargo loss and damage payments totaling $6,845,131, or 1.25 per cent of their gross revenues. This was a reduction of almost 10 per cent from the 1.38 loss and damage ratio recorded in 1945.

The combined cost of cargo insurance plus cargo loss and damage was $12,023,904 in 1946, representing 2.2 per cent of the motor carriers' gross revenues.

## Exports Take Many Cars, Trucks

Curtailment in purchases of American goods by countries experiencing a severe dollar shortage will be felt by the automotive industry, particularly that segment building trucks.

Approximately 8 per cent of American-built passenger cars have been exported, including shipments to Canada, and slightly more than 20 per cent of trucks are sold outside the country.

For the first five months of 1947, sales of automobiles, parts and accessories amounted to $484 million, almost half of which were shipped to Latin American republics. Europe's share was $78 million; Canada's $74 million; Africa's $44 million and the Far East's $37 million.

For the first seven months exports of trucks from United States plants amounted to 151,823 units out of a total production of 716,132. Passenger car exports amounted to 153,578 units out of a total output of 2,001,022.

While United States manufacturers easily can sell their entire passenger car output in this country, the diminution of the export trade will cause serious dislocations in their distribution setups. If truck exports are curtailed sharply, the rehabilitation of war damaged lands may be slowed.

## Seek Production Equipment

While sales of machine tools and equipment have been generally quiet for the past few weeks, and likely will continue so until after the Machine Tool Show at Chicago, there are a few projects active, including the Chevrolet-Cleveland parts plant which is taking quotations on presses, welding machines and equipment for a tool and die shop, for delivery next spring. Fenders and bumpers, for both production and service, will be two major products.

Chrysler is specifying equipment for a die shop to be installed at the Highland Park plant. The large independent tool and die shops in the Detroit area are not overly active and are mostly out of the equipment market.

# Edison Battery Starts $2 Million Expansion

Edison Storage Battery Division of Thomas A. Edison Inc., West Orange, N. J., has inaugurated a plant expansion program involving an expenditure of $2 million, George E. Stringfellow, vice president of Thomas A. Edison Inc. and general manager of the division, announced recently.

A postwar business volume 50 per cent greater than the average during the three years prior to the United States' entry into the war indicates a long-term growth, said Mr. Stringfellow. The division manufactures batteries, miners' cap lamps, portable lighting outfits, pharmaceutical iron and other products.

Bulk of the expenditures for the program will be for new equipment.

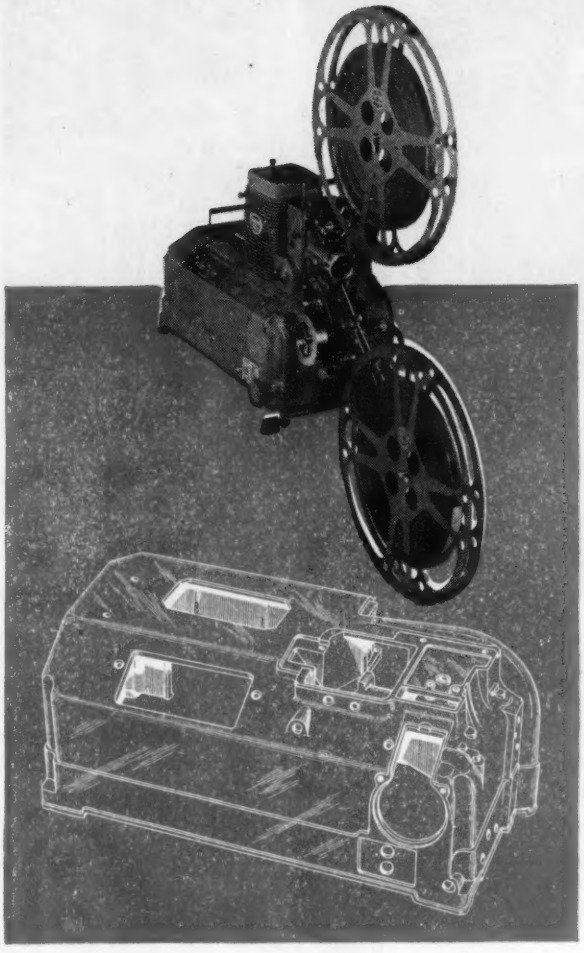
# AFA's 1948 Foundry Show Scheduled for Philadelphia

American Foundrymen's Association will hold its 1948 convention and foundry show at Philadelphia May 3-7, W. W. Maloney, secretary-treasurer of the organization, has announced.

The convention will be the sixth held by AFA in Philadelphia, where it was organized in 1896. Other meetings staged there were in 1907, 1919, 1928 and 1934.

E. C. Troy, vice president, Dodge Steel Co., and chairman of the Philadelphia chapter, will head the convention committees. Philadelphia Convention Hall and the Commercial Museum will house the exhibits and most of the sessions.

# PRACTICAL CONSIDERATIONS IN



## INTRICACY IS NO PROBLEM

In designing die castings the goal should be simplicity —in the sense that all non-essentials are eliminated— but complexity of shape can be a definite advantage if it results in overall production economies. For example, consider the motion picture projector housing here illustrated. *This is a one-piece zinc alloy die casting.*

Any other method of production for this housing would have entailed either a built-up assembly of a number of parts or exorbitant machining costs. As a die casting, the holes, recesses, bosses and intricate contours are achieved in a single operation and very little additional work beyond trimming is required prior to the application of a decorative finish. The obvious savings in machining and assembling easily compensate for the extra tooling costs and slower casting speeds involved in die casting a piece of such complexity.

In die casting there is no scrap loss and, since the average wall thickness of this housing is not much over 1/16", an absolute minimum of metal is consumed. An additional advantage is the smooth as-cast surfaces which facilitate the application of a handsome wrinkle lacquer finish.

## ALLOY SELECTION

Good die casting design is of no avail unless the proper alloy is selected. Furthermore, it is imperative that any alloy used in die casting production be carefully formulated with respect to every element involved to insure maximum mechanical properties and dimensional stability. If a zinc alloy is used, your die caster should provide one of those shown in the table below. These alloys are covered by specifications of the American Society for Testing Materials and the Society of Automotive Engineers.

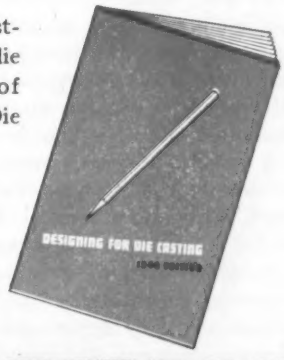
### Composition of Zinc Alloys For Die Castings

| Composition* % by Weight | ZAMAK†-3 A.S.T.M.-XXIII S.A.E.-903 | ZAMAK†-5 A.S.T.M.-XXV S.A.E.-925 |
|---|---|---|
| Copper | .10 Max. | .75 to 1.25 |
| Aluminum | 3.5 to 4.3 | 3.5 to 4.3 |
| Magnesium | .03 to .08 | .03 to .08 |
| Iron, Max. | .100 | .100 |
| Lead, Max. | .007 | .007 |
| Cadmium, Max. | .005 | .005 |
| Tin, Max. | .005 | .005 |
| Zinc | Remainder | Remainder |

*Composition as provided in A.S.T.M. and S.A.E. Specifications. The Zamak alloys meet these specifications but are held within closer limits as to composition.
† A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting".

**Send for your copy** ➡



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# Speeds Program For Production Of Clad Sheets

***American Cladmetals Co. accelerates project to produce stainless-copper clad sheets under the Kinney process***

AMERICAN Cladmetals Co., Pittsburgh, is accelerating its program to produce stainless-copper clad sheets under the Kinney process at its Carnegie, Pa., plant. Company plans to produce 6 to 8 million pounds of clad metal annually with the equipment it is originally installing.

C. H. Hunt Inc., consulting engineer, Pittsburgh, is laying out the plant, which will include a 42-inch hot mill stand, a 30-inch cold-reduction unit, and auxiliary equipment. Some of this equipment is in process of being reconstructed to meet company requirements. The finishing building, which the company purchased last year, is 500 ft long and 125 ft wide.

Specially designed cladding press, now being installed, will handle stainless-copper clad metal on a completely mechanized precision basis. The Kinney cladding processes and techniques make possible the cladding of stainless sheets and strip to copper; two very dissimilar metals with widely different physical characteristics. Stainless-copper clad sheets have been produced as thin as .017-inch thick, up to 27 inches wide.

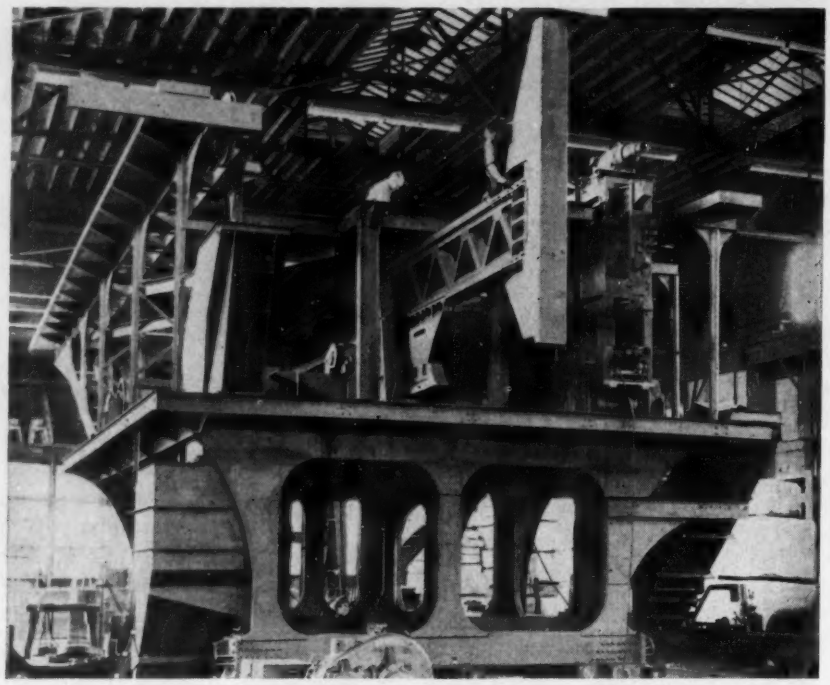
**Indicate Heat Transfer Quality**

Field tests, which appear to be confirmed by independent laboratory tests, indicate stainless clad copper has a quality of heat transfer not surpassed by other metals except copper and silver.

Heat treating practice has been determined which overcomes some earlier difficulties of heat treating the cladded product. The cladded metal has been subjected to extensive heat treatment experiments by reputable fabricators and heat treating specialists, in which various grades of cladded copper and stainless steel were employed. The tests took into consideration a wide temperature range, time cycles, amount of cold work, and type of quench employed. Results indicate that the company's cladded metal can be subjected to a wide range of drawing and forming operations.

The company's development program also involves the cladding of such dissimilar metals as aluminum to steel and silver to steel. Application of its products are being developed in the fields of jet propulsion engines, high compression bearings, exhaust systems, etc.

C. R. Anthony, chairman of the newly organized company, states it is impossible to accurately estimate the potential market for stainless-copper clad steels, except in very general terms. For cooking utensils alone, government statistics indicate the annual market at $150 million, and $700 million annually in the food processing industry. In both these fields and others wherever heat transfer with application of stainless steel is wanted, stainless-copper clad metal is a "natural," according to company officials.



**COKE PUSHER: Being completed by Koppers Co. Inc., Shops Division, at Baltimore is this 150-ton coke-pusher which will shove 15-ton charges of coke from steel mill ovens. Operating on a track beside the ovens, the pusher's equipment at upper right, including the two cylinders, loosens and removes heavy coke oven doors. The huge ram, center, then pushes glowing coke through the oven into a waiting car. This pusher, operated by one man, is run by 12 motors**

## Hercules Diversifies with Purchase of Star Mfg. Co.

Hercules Steel Products Corp., Galion, O., has concluded negotiations for the purchase of the capital stock of Star Mfg. Co., St. Louis, fabricator of restaurant equipment and popcorn roasting machinery, it has been announced by David Van Alstyne Jr., chairman of Hercules.

With consummation of the deal expected on or about Oct. 1, the acquisition will provide further diversification for the Hercules line, which already includes steel dump truck bodies, powered coal chutes, bulk cement carriers, lime spreaders and metallic burial vaults.

The purchase, involving an unspecified cash payment, is to be made from Julian Burch, founder and president of Star.

## Hotpoint Buys Milwaukee Facilities for $2,122,000

Hotpoint Inc., Chicago, has purchased two war plants in Milwaukee from War Assets Administration for $2,122,000. This move is part of a $20 million plant expansion program launched earlier this year by the General Electric affiliate.

The facilities are plants No. 2 and 3, used by Allis-Chalmers Mfg. Co. during the war for the manufacture of turbo-superchargers for aircraft. With initial production scheduled for next December, Hotpoint plans to use the property to make automatic electric water heaters, dishwashers, sink tops and cabinets.

## Merger of Talon Inc. with Canadian Firm Proposed

Stockholders of Talon Inc., Meadville, Pa., will be asked to approve a proposal to combine the resources of Talon with those of Lightning Fastener Co., Ltd., St. Catherines, Ont., Canada.

A proposed exchange of shares would be contingent upon approval by owners of at least 80 per cent of the outstanding stock of Lightning Fastener.

# BRIEFS . . .

***Paragraph mentions of developments of interest and significance within the metalworking industry***

**Systems and Procedures Association of America,** New York, is taking steps to triple its size and expand its program, according to an announcement by H. Kenneth Marks, newly elected president. The organization, a society of businessmen engaged in designing, installing and supervising business systems, aims at removing red tape, reducing costs and improving efficiency of business methods, forms and information records.

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**Cleveland Tapping Machine Co.,** Hartville, O., has appointed Meehan Engineering Co., Syracuse, N. Y., as its sales representative for northern New York state.

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**Ziv Steel & Wire Co.,** Chicago, has completed an expansion program at its Detroit branch with a 25 per cent increase in space and facilities.

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**Oldsmobile Division,** Detroit, General Motors Corp., has re-established three sales zones discontinued during the war at Oklahoma City, Okla., Memphis, Tenn., and Charlotte, N. C. A new zone has been organized at Des Moines, Iowa.

—o—

**Bingham Stamping Co.,** Toledo, O., which recently merged with Herbrand Corp., Fremont, O., announces its name has been changed to Bingham-Herbrand Corp. The Bingham Division makes emergency brake lever assemblies, while Herbrand Division will continue to manufacture mechanics' hand tools and commercial drop forgings.

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**Sintercast Corp.,** New York, has been formed by Erwin Loewy, president of Hydropress Inc., and associates. The firm will be devoted to consultation, research and development in the field of powder metallurgy.

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**War Assets Administration** is offering for sale the Wainwright shipyard, Panama City, Fla., comprising 14 separate areas capable of industrialization. Bids will be received at WAA's Jacksonville Regional Office until Sept. 18.

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**Commodity Standards Division,** National Bureau of Standards, has approved a voluntary Simplified Practice Recommendation for Plumbing Fixture Fittings and Trim for Housing. The recommendation will be available in printed form on or about Sept. 15.

—o—

**United States Steel Corp.,** Pittsburgh, has opened offices in Cleveland and Chicago for the sale and service of coal chemicals produced by U. S. Steel subsidiaries. The Cleveland office, in the Terminal Tower, is in charge of William K. Wood, while the Chicago office is under the direction of William G. Souder at 208 S. LaSalle St.

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**Scott-Newcomb Inc.,** St. Louis, has purchased two artillery fuse lines at the Arkansas Ordnance Plant, Jacksonville, Ark., for $100,000 each from WAA. Firm plans to use the facilities in production of air conditioning and heating equipment.

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**Council of Profit Sharing Industries,** Wooster, O., will hold a constituent meeting for its formal establishment in Cleveland, Oct. 17. Purpose of the council will be to bring together individuals practicing or interested in adopting or promoting profit sharing.

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**Atomic Energy Commission** has purchased building No. 401 at the Kentucky Ordnance Plant, Paducah, Ky., together with all contained electric and steam generating equipment, for $315,440, War Assets Administration has announced. The commission will dismantle the equipment for use elsewhere.

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**Carboloy Co. Inc.,** Detroit, has appointed A. L. Holcomb, Grand Rapids, Mich., as its dealer in the Grand Rapids and northwestern Michigan areas.

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**Avondale Marine Ways Inc.,** Westwego, La., last month laid the keel at its facilities on the New Orleans river front, for a large vessel for catching tuna.

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**Allen-Wales Machine Corp.,** subsidiary of National Cash Register Co., Dayton, O., has purchased a plant in Ithaca, N. Y., which it had hitherto leased, and intends to expand its operations.

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**Pittsburgh Metallurgical Co., Niagara** Falls, N. Y., has purchased for $325,000 a ferrosilicon plant in Charleston, S. C., from WAA. Buildings and equipment included in the sale are a main production building with furnace room, three electric furnaces, machine shop, storage house, ferrosilicon building and morley tower.

—o—

**Association of American Railroads,** Washington, announces that coal-burning locomotives propelled 47 per cent of the total passenger-train car-miles in all locomotive-propelled trains of Class I railroads in the first quarter of 1947, compared with 65 per cent in the same period of 1941. The use of diesels increased from 7 to 22 per cent over this six-year period.

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**Klem Chemical Works,** Detroit, has changed its name to Klem Chemicals Inc.

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**Special Products Division,** Cincinnati, Lodge & Shipley Co., plans to establish additional distributorships for its garden tractor in Denver, Salt Lake City, Utah, San Francisco and Portland, Oreg.

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**Radio Manufacturers Association,** Washington, reports nearly 10 million radio receiving sets were produced in the first seven months of this year. During July production declined by 56,686 units from the June level of 1,213,142.

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**Curtiss-Wright Corp.,** New York, is showing a mock-up of a freight plane which can carry 16 tons of freight at 300 miles an hour and at rates on a level with present rail express charges. The plane is 89 ft long, 32 ft high and is powered by four engines totaling 8400 hp.

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**Record Machine & Tool Co.,** Taft, Calif., has acquired additional space at 5742 Bandera St., Los Angeles, as a branch outlet for its main plant.

—o—

**War Assets Administration** has awarded a 15-year lease of government-owned facilities in Milwaukee to Albert B. Houghton who is acting as trustee for Crucible Steel Castings Co., now in voluntary bankruptcy proceedings and in the process of reorganization. To be rented for a minimum of $48,000 a year, the property consists of an office building, foundry, production laboratory and testing equipment. Plant has a capacity of 8000 tons of light and medium steel castings per year.

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**National Bureau of Standards,** Washington, has established a Division of Building Technology to deal with problems of structural engineering, fire protection, heating and other aspects of the subject.

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**University of Chicago** reports that it has set aside $12 million in university funds, to be spent on nuclear research. Bulk of this sum will be used for equipment and buildings to house the project.

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**War Assets Administration** reports that $753,602,000 in surplus property was disposed of during July, as compared with $1,233,000,000 in June. The administration points out that the June figure was unusually high because of the disposal of $556 million in surplus aircraft. The July figure compares favorably with sales in April and May.

# The Business Trend

## Sustained Demand Keeps Production Rate High

SUPPORTED by a very substantial demand for most all goods, industrial production held steady at a high rate during the week ended Aug. 30. A help in maintaining the high level of activity was a break that week in the heat wave which for several weeks had engulfed much of the industrial section of the nation with a resultant lowering of manpower efficiency and in some instances complete stoppage of work.

For the week ended Aug. 30 STEEL's industrial production index registered 159 per cent of the 1936-1939 average, unchanged from the preceding week. However, the index for the week ended Sept. 6 will show a decline due to the Labor Day holiday.

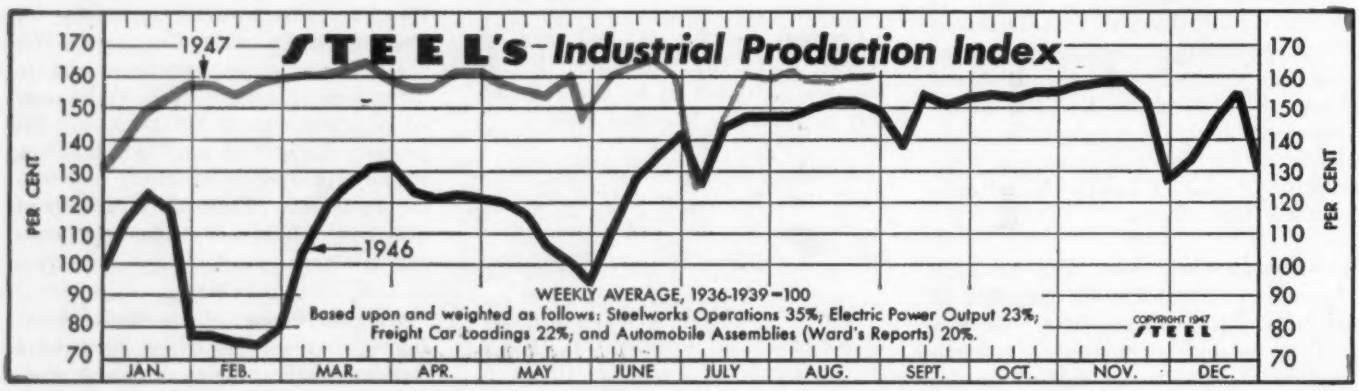
**STEEL**—Ingot production in the week ended Aug. 30 continued unchanged at 93 per cent of capacity, and high level operations are foreseen well through 1948, for it now appears it will take that long to effect a supply-demand balance in the major steel products.

**AUTOS**—Output of the automobile industry in the week ended Aug. 30 rose slightly from that of the preceding week but did not show any spectacular upward movement because two important producers were closed for inventory and steel stockpiling. According to *Ward's Automotive Reports*, production in the week ended Aug. 30 amounted to 86,958 passenger cars, trucks and busses, compared with 84,726 in the preceding week. Because of insufficient supplies of steel, the auto industry's output in September is not expected to be much better than that of either July or August. Preliminary figures indicate August production hit the lowest point since September, 1946.

**COAL**—Rising slightly, bituminous coal production in the week ended Aug. 23 reached the second highest level attained since the miners went back to work under their new contract. However, the estimated output of 11,940,000 tons that week was considerably below the 12½ and 13 million ton weekly output prevailing before the new contract went into effect.

**PRICES**—Upward trend of the U. S. Bureau of Labor Statistics wholesale price index continued in the week ended Aug. 23 when it reached 153.5 per cent of the 1926 average. The current level is 1.9 per cent above a month earlier and 19.5 per cent above a year ago. Shrinking of U. S. exports is being watched as a possible check on price inflation. While domestic demand can take up a considerable part of the slack growing out of curtailments in exports, the channeling of additional goods into domestic markets is viewed as a possible braking action on inflationary trends.

**PRODUCTION** — Work stoppages, vacations and continued shortages of materials cut the Federal Reserve Board's industrial production index in July to the lowest level since August, 1946. At 178 per cent of the 1935-1939 average, the July index was six points below that of June. However, a somewhat higher level is expected to be reported for August.




**The Index (see chart above):** Latest Week (preliminary) 159 Previous Week 159 Month Ago 162 Year Ago 149

## FIGURES THIS WEEK

| INDUSTRY | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Steel Ingot Output (per cent of capacity)† | 93.0 | 93.0 | 95.0 | 90.0 |
| Electric Power Distributed (million kilowatt hours) | 4,940‡ | 4,953 | 4,806 | 4,404 |
| Bituminous Coal Production (daily av.—1000 tons) | 1,990 | 1,958 | 1,967 | 2,026 |
| Petroleum Production (daily av.—1000 bbl.) | 5,171‡ | 5,153 | 5,088 | 4,833 |
| Construction Volume (ENR—Unit $1,000,000) | $136.9 | $109.4 | $100.8 | $79.9 |
| Automobile and Truck Output (Ward's—number units) | 86,958 | 84,726 | 97,712 | 74,960 |

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.
‡ Preliminary.

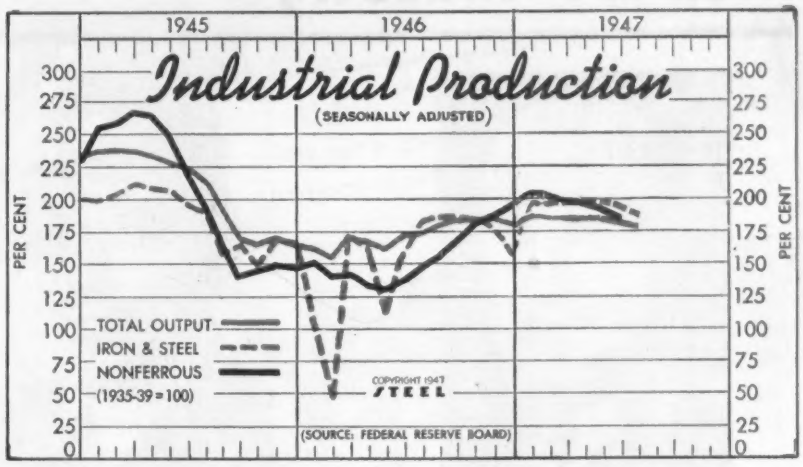
| TRADE | | | | |
|---|---|---|---|---|
| Freight Carloadings (unit—1000 cars) | 900† | 901 | 922 | 908 |
| Business Failures (Dun & Bradstreet, number) | 64 | 59 | 69 | 28 |
| Money in Circulation (in millions of dollars)‡ | $28,302 | $28,239 | $28,129 | $28,376 |
| Department Store Sales (change from like wk. a yr. ago)‡ | —6% | —6% | +5% | +40% |

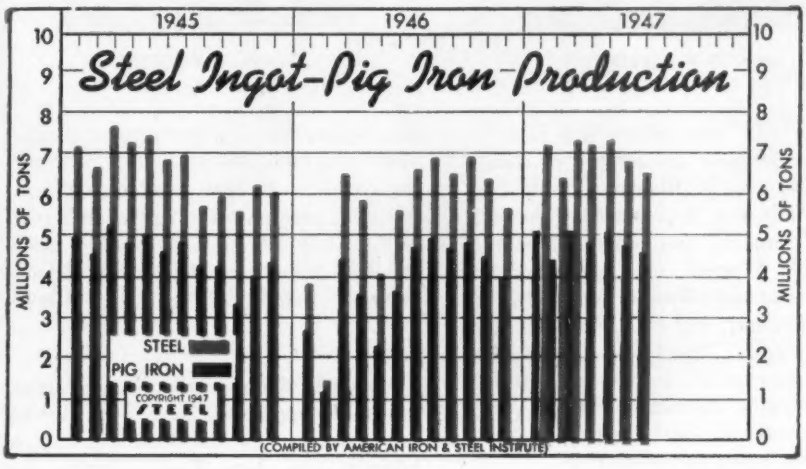
† Preliminary. ‡ Federal Reserve Board.

### Federal Reserve Board's Production Indexes

(1935-39=100)

| | Total Production | | Iron, Steel | | Nonferrous | |
|---|---|---|---|---|---|---|
| | 1947 | 1946 | 1947 | 1946 | 1947 | 1946 |
| Jan. | 189 | 160 | 192 | 102 | 204 | 150 |
| Feb. | 189 | 152 | 191 | 43 | 205 | 141 |
| Mar. | 190 | 168 | 196 | 169 | 199 | 139 |
| Apr. | 186 | 165 | 195 | 159 | 197 | 132 |
| May | 185 | 159 | 197 | 109 | 187 | 128 |
| June | 184 | 170 | 193 | 154 | 179 | 137 |
| July | 178 | 172 | 181 | 180 | ... | 151 |
| Aug. | ... | 178 | ... | 184 | ... | 159 |
| Sept. | ... | 180 | ... | 185 | ... | 172 |
| Oct. | ... | 182 | ... | 184 | ... | 184 |
| Nov. | ... | 183 | ... | 178 | ... | 192 |
| Dec. | ... | 182 | ... | 159 | ... | 197 |
| Ave. | ... | 171 | ... | 150 | ... | 157 |




### Iron, Steel Production

(Net Tons—000 omitted)

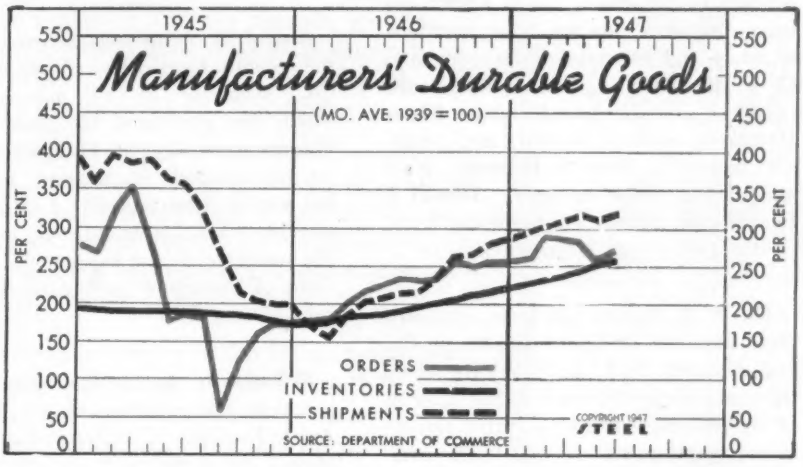
| | Steel Ingots | | | Pig Iron | |
|---|---|---|---|---|---|
| | 1947 | 1946 | 1945 | 1947 | 1946 |
| Jan. | 7,213 | 3,872 | 7,204 | 5,071 | 2,645 |
| Feb. | 6,422 | 1,393 | 6,653 | 4,550 | 1,148 |
| Mar. | 7,307 | 6,507 | 7,706 | 5,123 | 4,424 |
| Apr. | 7,043 | 5,860 | 7,290 | 4,830 | 3,614 |
| May | 7,329 | 4,072 | 7,450 | 5,081 | 2,275 |
| June | 6,969 | 5,625 | 6,841 | 4,810 | 3,682 |
| July | 6,572 | 6,610 | 6,986 | 4,585 | 4,705 |
| Aug. | .... | 6,887 | 5,735 | .... | 4,898 |
| Sept. | .... | 6,518 | 5,982 | .... | 4,687 |
| Oct. | .... | 6,910 | 5,597 | .... | 4,815 |
| Nov. | .... | 6,409 | 6,200 | .... | 4,435 |
| Dec. | .... | 5,701 | 6,058 | .... | 3,992 |
| Total | | 66,364 | 79,702 | .... | °45,379 |

° Adjusted.

### Index of Manufacturers' Durable Goods

(Mo. Ave. 1939=100)

| | Orders | | Shipments | | Inventories | |
|---|---|---|---|---|---|---|
| | 1947 | 1946 | 1947 | 1946 | 1947 | 1946 |
| Jan. | 270 | 176 | 292 | 169 | 226 | 171 |
| Feb. | 295 | 179 | 311 | 153 | 232 | 174 |
| Mar. | 288 | 203 | 312 | 183 | 238 | 181 |
| Apr. | 279 | 219 | 320 | 203 | 244 | 182 |
| May | 256 | 224 | 313 | 207 | 251 | 184 |
| June | 269 | 231 | 323 | 212 | 255 | 189 |
| July | ... | 229 | ... | 216 | ... | 195 |
| Aug. | ... | 232 | ... | 233 | ... | 200 |
| Sept. | ... | 254 | ... | 259 | ... | 206 |
| Oct. | ... | 248 | ... | 262 | ... | 211 |
| Nov. | ... | 254 | ... | 278 | ... | 215 |
| Dec. | ... | 271 | ... | 292 | ... | 220 |
| Ave. | ... | 227 | ... | 222 | ... | 194 |




## FINANCE

| | Latest Period° | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Bank Clearings (Dun & Bradstreet—millions) | $11,873 | $12,030 | $11,941 | $11,074 |
| Federal Gross Debt (billions) | $260.0 | $260.0 | $259.3 | $267.8 |
| Bond Volume, NYSE (millions) | $13.4 | $14.9 | $18.5 | $20.7 |
| Stocks Sales, NYSE (thousands) | 3,059 | 3,073 | 5,256 | 6,875 |
| Loans and Investments (billions)† | $63.6 | $63.5 | $63.5 | $60.0 |
| United States Gov't. Obligations Held (millions)† | $38,527 | $38,588 | $39,154 | $41,571 |

† Member banks, Federal Reserve System.

## PRICES

| | | | | |
|---|---|---|---|---|
| STEEL's composite finished steel price average | $75.41 | $75.41 | $75.41 | $64.45 |
| All Commodities† | 153.5 | 152.7 | 150.6 | 128.4 |
| Industrial Raw Materials† | 167.7 | 166.8 | 166.0 | 144.9 |
| Manufactured Products† | 148.3 | 147.8 | 145.0 | 123.6 |

† Bureau of Labor Statistics Index, 1926=100.

# Men of Industry

DAVID K. MILLER

ARNOLD H. MAREMONT

HENRY V. BOOTES

**David K. Miller,** formerly manager of the Baltimore branch of Crucible Steel Co. of America, New York, has been appointed a special representative to the company's branches in promotion of alloy and machinery steels. He has been associated with the company over 20 years, and had been a representative at the Philadelphia and Chicago branches of the company.

—o—

The Empire Steel Corp., Mansfield, O., announces the following elections and changes of personnel: **A. J. Krantz** has been elected a director, vice president, secretary and treasurer of the company; **C. F. Beddard** has been elected vice president in charge of sales; **Elmer Hamaker,** assistant secretary and assistant treasurer; **Donald Hattman,** plant auditor and office manager. **Samuel J. Reeves** also has been elected to the board of directors of the corporation.

—o—

**Dr. W. L. Barrow** has been appointed chief engineer of Sperry Gyroscope Co. Inc., Great Neck, L. I., N. Y. He joined the company in 1943 as full-time director of armament engineering, after serving several years as a consultant to the company.

—o—

**Harold M. Winters,** formerly east-central regional manager for RCA Victor Division of Radio Corp. of America, New York, has been named director of the company's distribution department.

—o—

**Lynn Eaton,** formerly eastern regional sales manager, Bendix Home Appliances Inc., South Bend, Ind., has been named director of districts for the corporation. He will have headquarters in South Bend.

—o—

Rheem Mfg. Co., San Francisco, announces formation of a subsidiary company in Canada to be known as Rheem Canada Ltd. The offices and plant of the new company are located in Hamilton, Ont. **R. S. Rheem,** president of Rheem Mfg. Co., is president of the subsidiary company, and other officers are: **Trumbull Warren,** vice president and general manager; **Ronald L. Marks,** secretary-treasurer; and **E. L. Prais,** production manager. Production in this plant will commence in another month with steel shipping containers for the petroleum, chemical, food, paint and other industries being manufactured.

—o—

**Arnold H. Maremont** is president of the recently formed Phoenix-Apollo Steel Co., syndicate of 25 manufacturers, which has purchased the plant of the Phoenix Iron Co. at Phoenixville, Pa., for approximately $4 million. The plant has a steel ingot capacity of 30,000 tons monthly. Mr. Maremont, who organized the syndicate, is also executive vice president of Maremont Automotive Products Inc., Chicago.

—o—

**William M. Austin** has been elected president and chairman of the board of Austin-Hastings Co. Inc., Cambridge, Mass. He started with the company in 1926 as a salesman, then became manager of one of the divisions, and later was elected treasurer of the corporation. **Arthur B. Kettle,** a director and vice president, has been elected executive vice president and general manager. He also was manager of the Machinery Division, and is succeeded in that position by **Leon L. Clore. Stuart L. Harrod,** equipment engineer, General Electric Co., Schenectady, N. Y., has been appointed to succeed Mr. Clore as western New England representative in the Machinery Division of Austin-Hastings Co.

—o—

**Dr. Frederick Port** has been appointed production superintendent of Cribben & Sexton Co., Chicago, stove manufacturer, to succeed **Fred Doering.** Dr. Port joined the company in 1946 as chief engineer, following service in the Ordnance branch of the Army. Prior to the war he headed the combustion engineering department of Republic Steel Corp., Cleveland.

—o—

**Henry V. Bootes,** formerly sales agent, has been appointed New York district sales manager for the American Car & Foundry Co., New York. During the war he saw combat duty in the South Pacific, where he served as a major in the Marine Corps, and prior to that was New York district manager of the Ohio Injector Co., Wadsworth, O., manufacturer of railroad equipment.

—o—

**R. A. Henderson** has been elected president of the Meadville Malleable Iron Co., Meadville, Pa., succeeding the late **John E. Reynolds.** Mr. Henderson has been vice president of the company and has served on the board for ten years.

—o—

**F. E. Scheven,** vice president of General Electric X-Ray Corp., Chicago, has been placed in charge of the Employe Relations Division, succeeding **F. J. Walters Jr.,** who recently resigned to become manager of Industrial Relations at Hotpoint Inc., subsidiary of General Electric Co. **W. E. Ferebee** has been appointed executive assistant to Mr. Scheven, in charge of the operations of the division.

—o—

Election of two new vice presidents and re-election of other officers of the Mechanics Universal Joint Division, Borg-Warner Corp., Chicago, have been announced: **C. E. Palmer,** former works manager, has been named vice president in charge of manufacturing for both of the division's plants—one at Rockford,

# a New Idea in A.C. and D.C. Switching Relays

**Using a magnetic actuator with one or more self-contained contact mechanisms of the quick-make and break type**

PART OF THE PARADE OF NEW DESIGNS

Class 7001 D.C. and Class 8501 A.C. Type P Relays have magnetic actuators and contact mechanisms of similar design.

**APPLICATION** • Switching relays are used to set up complicated control circuits, pilot larger magnetic devices, energize lights or audible signals, isolate low voltage circuits and occasionally to control very small motors having integral overload protection. They must be compact, inexpensive, fast, dependable, easily installed, and have comparatively low magnet coil demand.

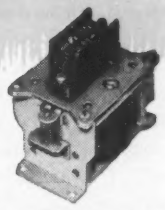
**SQUARE D's DESIGN** meets those specifications. It is mounted and wired from the front, requires no extra space for electrical or mechanical clearances; consists of standard parts; has short stroke and straight line action; utilizes one, two or three individually-enclosed snap-action contacts of double-throw construction; can be readily converted to meet job requirements; and comes with either A.C. or D.C. magnetic actuators of similar design.

*Flexibility* is a characteristic of growing importance in the field of automatic control. Use of an A.C. or D.C. magnetic actuator of similar design with one, two or three self-contained contact mechanisms, each having one normally-open and one normally-closed contact, results in a switching relay to meet nearly all requirements. Actuators with only one contact mechanism (carried in stock) may be readily converted to additional poles by installation of either one or two additional standard contact mechanisms, also from stock. Contact mechanisms are easily and quickly renewed in the field with a minimum of expense.

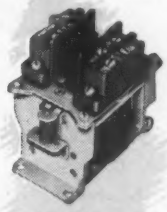
***Write*** **for complete details on Type P Switching Relays. Address SQUARE D CO., 4041 N. Richards St., Milwaukee 12, Wis.**

**CONTACT RATINGS**

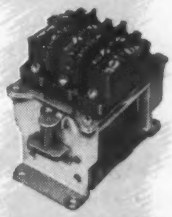
| | A.C. Voltage | | | | D.C. Voltage | | |
|---|---|---|---|---|---|---|---|
| Electrical Ratings | 110 | 220 | 440 | 550 | 115 | 230 | 550 |
| Normal Amperes | 15 | 10 | 6 | 5 | 2 | 0.5 | 0.1 |
| Inrush Amperes | 40 | 20 | 10 | 8 | ... | ... | ... |



1 Pole, Double throw, D.C. Class 7001 Type PO-1



2 Pole, Double throw, D.C. Class 7001 Type PO-2



3 Pole, Double throw, D.C. Class 7001 Type PO-3

**SQUARE D COMPANY**

DETROIT • MILWAUKEE • LOS ANGELES

*In Canada:* SQUARE D CANADA, LTD., TORONTO, ONT. • *In Mexico:* SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

Ill., and one under construction in Memphis, Tenn. **Fred M. Potgieter** has been named vice president in charge of truck, agricultural implement, industrial and aviation sales. **G. C. Gridley** has been re-elected president and general manager, and **R. R. Rolph** re-elected vice president in charge of automotive sales.

—o—

**Edward J. Malvey** has been promoted to advertising manager of Chase Brass & Copper Co., Waterbury, Conn. He joined the company in 1924, having previously been connected with the advertising department of Winchester Repeating Arms Co., New Haven, Conn.

—o—

**Frank A. Young,** with Allis-Chalmers Mfg. Co., Milwaukee, since 1923 and a representative in its Duluth branch office since 1944, has been named manager of the office. **Thomas S. Wilmeth** has been appointed assistant production control manager of general machinery at the company's West Allis, Wis., works. He succeeds **R. L. Brueewitz,** resigned. Mr. Wilmeth has been with the company since 1936. Recently he had been assistant superintendent of material control.

—o—

**Joseph F. McCarthy** and **Rear Admiral Lawrence B. Richardson, USN (ret.),** have been elected vice presidents of Curtiss-Wright Corp., New York. Mr. McCarthy has been treasurer and controller of the company since last January. Admiral Richardson joined the company a year ago as executive assistant to the president.

—o—

The Steel Co. of Canada Ltd., Hamilton, Ont., announces the following staff changes: **H. M. Griffith,** recently general superintendent of the Hamilton and Ontario Works, has been named works manager of these plants. The former embodies the company's primary steel operations. **Geo. F. McAleer,** formerly assistant general superintendent, has been named assistant works manager, Hamilton and Ontario Works.

—o—

**William S. Straub** has been appointed superintendent, and **Leonard J. Rimlinger** and **Ed. J. Corell,** assistant superintendents, at the Barberton, O., plant of Pittsburgh Plate Glass Co., Pittsburgh. Mr. Straub succeeds **R. L. Hutchison,** recently named general superintendent for all plants operated by Columbia Chemical Division and the Southern Alkali Corp., a subsidiary. Mr. Rimlinger will be in charge of maintenance and engineering, and Mr. Corell in charge of production.

—o—

**Walter Prokosch,** formerly with Eastern Air Lines Inc., New York, has been elected vice president in charge of airport planning for George S. Armstrong & Co. Inc., New York, industrial engineers and management consultants.

—o—

**Andrew Anderson** has been appointed supervisor of the administrative control section of the northeast region of Ford Motor Co., Dearborn, Mich., and **William P. Bave** has been named manager of the truck and fleet sales department.

—o—

**W. Lynwood Smith,** Butler Bros., Chicago, has been appointed director of merchandising, and will maintain headquarters at Chicago. He joined the company in 1942, and since last March has been in charge of the New York office. **Earl Tanner** has been named assistant merchandising director in charge of the latter office.

—o—

**W. B. Peirce,** president of the American Society of Tool Engineers, has resigned as vice president in charge of research and development of Flannery Bolt Co., Bridgeville, Pa., in order to devote more time to the activities of the ASTE. He will also be connected with G. C. Wood Co., Pittsburgh, manufacturers' representative.

—o—

**Dr. Bruce S. Old** has been appointed consultant to the Atomic Energy Commission, Division of Research, in the capacity of chief metallurgist. He will continue his present work with Arthur D. Little Inc., Cambridge, Mass., industrial research laboratory, and will serve the Atomic Energy Commission on a part-time leave of absence from Arthur D. Little Inc. Dr. Old will assist in organizing the work of the Commission in the metallurgical field.

—o—

Appointments to the Steel Division Research Committee of American Foundrymen's Association have been announced. The group, which will direct AFA-sponsored research in steel technology, will be headed by **Clyde Wyman,** metallurgist with Burnside Steel Foundry Co., Chicago. **Charles F. Christopher,** Continental Foundry & Machine Co., East Chicago, Ind., has been named committee secretary. Also included on the committee are: **R. H. Frank,** Bonney-Floyd Co., Columbus, O.; **Gustaf A. Lillieqvist,** research director at the Indiana Harbor works of American Steel Foundries, East Chicago; and **Dr. C. H. Lorig,** Battelle Memorial Institute, Columbus, O.

—o—

Metal & Thermit Corp., New York, announces appointment of **O. L. Howland** as sales manager of the Welding Division, with headquarters at Chicago. He joined the company in 1943 as district manager of the Chicago branch. During the war he headed the War Production Board's Welding Division. He had previously been connected with the Hollup Corp., Chicago. As aide to Mr. Howland, **Wm. C. Cuntz** has been made assistant manager of the corporation's Welding Division, with headquarters at Pittsburgh.

—o—

**Alfred Marchev** has been elected president and general manager of Aircraft Screw Products Co. Inc. of Long Island City, New York, manufacturer of helicoil and aero-thread screw thread systems. He formerly had been president and chairman of the board of Republic Aviation Corp., Farmingdale, L. I., N. Y.

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**The Hon. John R. Alison,** assistant secretary of Commerce for Aeronautics, has been appointed to the National Advisory Committee for Aeronautics.

—o—

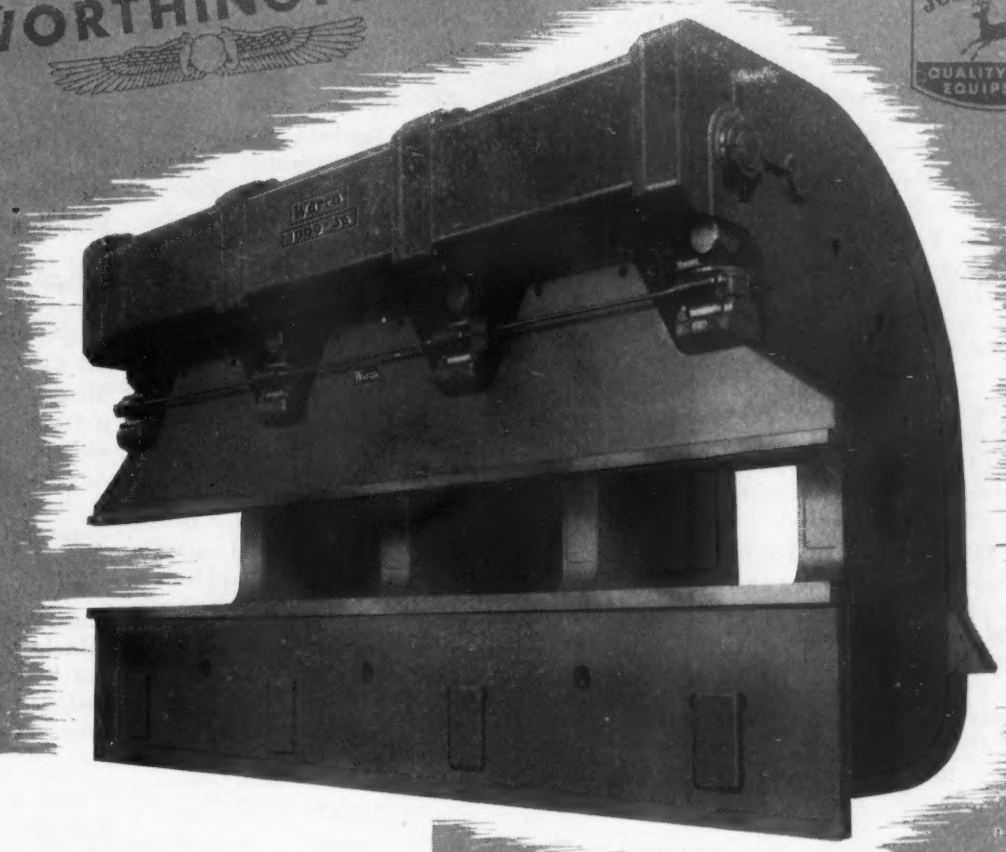
**A. F. Spring,** who formerly headed the Continental Trading Corp., Cleveland, has been appointed to the newly-created position of export manager of the Weatherhead Co., Cleveland, in charge of all company exports. He will maintain headquarters at Cleveland. During the war Mr. Spring served as director of manpower, Air Materiel Command of the Army Air Forces at Wright Field, and previous to that had been vice president of the Burgess Co., the Lake Erie Chemical Co., and U. S. Ordnance Engineers Inc., all of Cleveland. **William L. Hauck** has been appointed eastern district sales manager of the Weatherhead Co., with headquarters at New York. He formerly had been manager of the Trageser Copper Works, Maspeth, L. I., N. Y., and district sales manager for the Scaife Co., New York.

—o—

**H. C. Hickock** has been appointed general sales manager of the Baker Ice Machine Co. Inc., Omaha, Nebr. He formerly was connected with the Sturtevant Division of Westinghouse Electric Corp.,

A. F. SPRING

# LEADERSHIP based on consistent PERFORMANCE



## WORLD'S LARGEST MECHANICAL PRESS BRAKE

WARCO leadership—based on knowledge of press users' needs, sound engineering design and close-tolerance workmanship for consistent, trouble-free performance—is exemplified by this huge brake recently delivered to the Jones & Laughlin Steel Corporation. Fully *stress-relieved welded steel construction,* 1000-ton rated capacity for bending mild steel plate ⅝-inch thick in 36-foot lengths. Weight without dies over 500,000 pounds.

**WARREN CITY MANUFACTURING COMPANY**

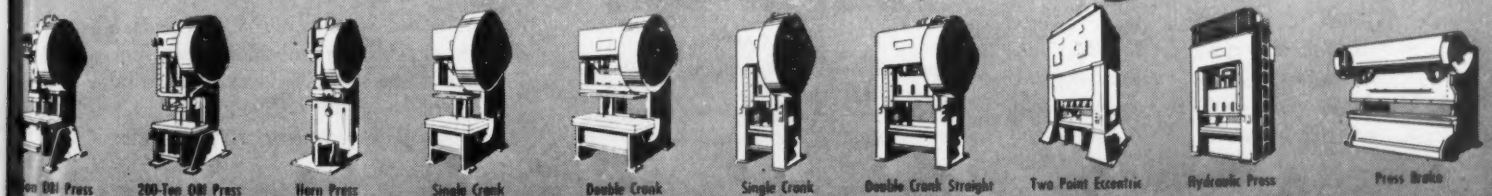
497 Griswold Street, Warren, Ohio

*A subsidiary of The Federal Machine and Welder Company*

*Offices in Principal Cities*

JONES & LAUGHLIN STEEL CORPORATION

**Warco PRESSES**



200-Ton OBI Press | Horn Press | Single Crank Gap Press | Double Crank Gap Press | Single Crank Straight Side Press | Double Crank Straight Side Press | Two Point Eccentric Gear Press | Hydraulic Press | Press Brake

Pittsburgh. His headquarters will be at South Windham, Me.

—o—

Kingwell Bros. Ltd., San Francisco, has recently appointed three new sales and service engineers to work with industry. **Edward L. Unger** will cover the southern California industrial area, and will work with Almquist Bros., Los Angeles. **Tore Franzen** will serve the San Francisco Bay area. **William McFate** will serve northern California industry. Both Mr. McFate and Mr. Franzen will work in co-operation with Kingwell Bros., northern California distributors; Industrial Bearings Inc., San Francisco and Oakland; Masterson Bearing Co., San Jose; the Bearing House, Sacramento; Bearing Supply, Stockton; and Kyle & Co., Stockton and Fresno.

—o—

**John F. McClenahen** has been named manager of the Standardizing Division of the lamp department of General Electric Co., Schenectady, N. Y., succeeding **Raymond B. Walling,** who has retired.

—o—

**Benjamin H. Rogers** has been appointed sales manager of Arrow Safety Device Co., Medford N. J., manufacturer of automotive lighting and safety equipment.

—o—

The Thermoid Co., Trenton, N. J., has announced the following appointments to the staff of the Automotive Division: **Phil Shafer,** fleet sales and service engineer, to have charge of the midwest area, with headquarters in Chicago; **L. I. Berry,** production engineer for the Molded Division; **M. R. Bell,** assistant rubber production manager; and **Miriam C. Ronga,** advertising assistant.

—o—

**W. H. Williams,** chairman of the board and a director of the Clark Controller Co., Cleveland, has resigned both posts. He had been one of the founders of the company, and associated with it for the past 22 years, during which time he served as vice president in charge of sales, executive vice president and general manager, president, and then chairman of the board.

—o—

**E. P. Gaffney,** formerly of the Machinery Steel Sales Division, Crucible Steel Co. of America, New York, has been appointed manager of the combined Alloy & Machinery Steel Sales Division.

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**R. L. Dustman** has been appointed manager of General Motors' new Chevrolet-Cleveland Parts Division plant under construction at Cleveland.

—o—

**William E. Butts** has been elected president of Enterprise Engine & Foundry Co., San Francisco, to succeed **Charles J. P. Hoehm Sr.** Mr. Butts, who is also vice president of General Metals Corp., Oakland, Calif., will retain that post.

—o—

**Harvey A. Mylander** has been appointed district manager for southern California and Arizona for the De Laval Steam Turbine Co., Trenton, N. J. He had been formerly associated with the General Electric Co., Schenectady, N. Y., and the American Hoist & Derrick Co., St. Paul, and had previously spent several years as sales engineer for the International General Electric Co. in Venezuela. In his new assignment, Mr. Mylander will have headquarters at Los Angeles.

—o—

**R. J. Tremblay** has been appointed assistant general superintendent at the Los Angeles steel plant of Bethlehem Pacific Coast Steel Corp., San Francisco, subsidiary of Bethlehem Steel Co. He had served formerly as assistant superintendent of rolling mills at the company's Seattle plant.

—o—

**David Lyle** has joined Continental Foundry & Machine Co., East Chicago, Ind., as assistant vice president in charge of engineering. He will be located at the Pittsburgh office. His more than 20 years of engineering experience has been principally in the steel and allied industries, and until recently he had been engineer of roll and mill department at the Mesta Machine Co., West Homestead, Pa.

—o—

**W. S. Ginn** has been appointed assistant manager-sales in the transformer section of the Transformer Division, General Electric Co., Schenectady, N. Y.

—o—

Raybestos-Manhattan Inc., Passaic, N.J., has announced the following appointments in the Equipment Sales Division: **Harry C. Dishman,** equipment sales manager, with headquarters in Detroit; **George T. Young,** branch manager of the Detroit office; **E. E. Juergens,** branch manager of the Cleveland office; and **John E. Cole,** branch manager of the Chicago office.

H. C. CARROLL

*Appointed engineer in charge of Marine & Aeronautics Engineering Division, General Electric Co., Schenectady, N. Y. Noted in STEEL, Sept. 1 issue, p. 68*

—o—

**Henry Coughlin,** superintendent of transportation and labor, Chicago district, Republic Steel Corp., Cleveland, has been appointed chairman of the corporation's transportation committee. He succeeds **George Hackett,** superintendent of transportation for the corporation in the Youngstown district.

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**Lewis M. Bound Jr.** has been appointed west coast manager, Weldings Fittings Division, Tube Turns Inc., Louisville, Ky. His headquarters will be in San Francisco.

—o—

**Carlton S. Proctor** has been elected to the board of directors of ATF Inc., New York. He has been senior partner with the firm of Moran, Proctor, Freeman & Musser, New York, identified with construction projects in the United States and abroad, and was past director of the American Society of Civil Engineers and of the American Institute of Consulting Engineers.

—o—

Burdett Mfg. Co., Chicago, has announced the appointment of **Donald C. Scheele** as general and sales manager, and **Robert B. McCormick** as treasurer. Both men have been with the gas burner manufacturing company for several years.

—o—

**Fred H. Lucas** and **Max H. Hofmann** have been appointed assistant managers of sales, Structural & Plate Division, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Lucas, who had been with American Bridge Co. prior to joining Carnegie-Illinois in 1927 as promotional engineer, had until his present appointment been manager of sales, Structural Division, Chicago. In 1943 Mr. Hofmann joined the U. S. Steel Corp. subsidiary as sales engineer in the Structural & Plate Division after serving as associate chief of the plate section, Steel Division, War Production Board. Prior to that he had been employed by Lukens Steel Co., Coatesville, Pa.

—o—

**Dr. C. H. Mathewson,** professor of metallurgy at Yale University since 1919, has been named to receive the Gold Medal of the American Society for Metals at its annual meeting in October.

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American Steel & Wire Co., Cleveland, U. S. Steel Corp. subsidiary, announces appointment of the following in the sales department of the Cyclone Fence Division: **J. F. Boyce,** district sales manager

JAMES F. RINKE
*Appointed chief engineer, Potter & Brumfield Mfg. Co., Princeton, Ind. Noted in STEEL, Sept. 1 issue, p. 66*

HARRY R. BARTELL
*Appointed assistant vice president, General Steel Castings Corp., Eddystone, Pa. Noted in STEEL, Sept. 1 issue, p. 68*

GEORGE J. BUCKNER
*Appointed assistant general manager, Bethlehem plant, Bethlehem Steel Co. Noted in STEEL, Sept. 1 issue, p. 66*

at Waukegan, Ill.; **R. W. Ewert,** district sales manager of the southeastern district; **J. D. Filer,** promoted to the position of assistant district sales manager of the eastern district, and **E. Kyndberg** has been made general sales manager of the division, with headquarters at Cyclone's main office at Waukegan.

—o—

**William E. Clark**, general manager of the Keystone Division of Dravo Corp., Pittsburgh, has been elected a vice president of the corporation. One-time president of Miller & Coulson Co., Pittsburgh, Mr. Miller later acquired control of that company and operated it as the W. E. Clark Co. This company merged with the Keystone Division in 1945, and its activities continue under the Keystone name. Mr. Clark also is a director of the corporation.

—o—

**Harry Y. McCool Sr.,** superintendent of maintenance of the Timken Roller Bearing Co., Canton, O., in the Steel and Tube Division, has retired after 31 years' service. **Leland S. Steiner** has been named to succeed Mr. McCool.

—o—

**Edgar J. Reichenbach** has been appointed manager, Specialties & Machinery Division of the general sales department of United States Steel Supply Co., U. S. Steel subsidiary.

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**M. W. Dulian** has been appointed eastern sales manager for Tucker Corp., Chicago. He has been with the Buick Division of General Motors Corp. for nine years. He will open offices in New York.

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**Ralph Haddox,** assistant manager of the tubular department of Oil Well Supply Co., a U. S. Steel Corp. subsidiary, has transferred his headquarters from Charleston, W. Va., to 1607 Frick Bldg., Pittsburgh.

## OBITUARIES

**Walter J. Bothwell,** 59, founder and president of Plymouth Steel Co., Detroit, died in that city Aug. 28 after a year's illness. He began his career with Union Drawn Steel Co., Beaver Falls, Pa., and later became district sales manager for Jones & Laughlin Steel Corp. in Detroit. In 1942 he left that company to organize the Plymouth company.

—o—

**William B. Baggaley,** 61, president, Northwestern Zinc Co., Dubuque, Iowa, died Aug. 28 in Chicago.

—o—

**Samuel G. Eastman,** 70, president and general manager, Belvidere Screw & Machine Co., Belvidere, Ill., died Aug. 30 in Denver.

—o—

**Maurice Hooff,** 47, general production manager of the Hyster Co., Portland, Oreg., died recently.

—o—

**Elmer S. Sisson,** 65, retired credit manager of Cleveland Cliffs Iron Co., Cleveland, died Aug. 31 of a heart attack. Associated with the company for 17 years, Mr. Sisson had previously been connected with the Pittsburgh & Ohio Mining Co., Cleveland.

—o—

**Dr. William E. Wickenden,** 64, retired president of Case Institute of Technology, Cleveland, died Sept. 1 in Monadnock Community Hospital, Peterboro, N. H. He was stricken with a heart attack Aug. 20. Shortly before he became ill he had been selected by the Engineers Joint Council as its representative on the United States Commission for UNESCO—United Nations Educational, Scientific and Cultural Organization. His retirement from Case Institute became effective only a few hours before his death.

—o—

**Henry W. Thomsen,** 62, retired general superintendent and director of the Burke Steel Co., Rochester, N. Y., and former vice president of the Hammond Steel Co., Solvay, N. Y., died Aug. 23.

—o—

**Alexander S. Hamill,** 68, president of the Hamill Iron Works, Jersey City, N. J., died suddenly Aug. 30.

—o—

**Frederick P. Assmann,** 65, president of the Precision Castings Co. Inc., Fayetteville, N. Y., died Aug. 31.

—o—

**Albin Seidel,** a partner and vice president of the Becker-Seidel Co., Cleveland, for 25 years before his retirement five years ago, died Aug. 30 after an illness of several years.

—o—

**Arthur M. Wood,** 86, president of A. M. Wood & Co., Philadelphia, died Aug. 25. In 1913 Mr. Wood, iron and steel merchant, founded the company which bears his name.

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**Andrew M. Snodgrass,** 53, production manager for the General Electric Co. in Pittsfield, Mass., died Aug. 26.

—o—

**George W. Dewees,** 67, Florida sales and service agent of SKF Industries Inc., Philadelphia, died recently at his home in Clearwater, Fla.

—o—

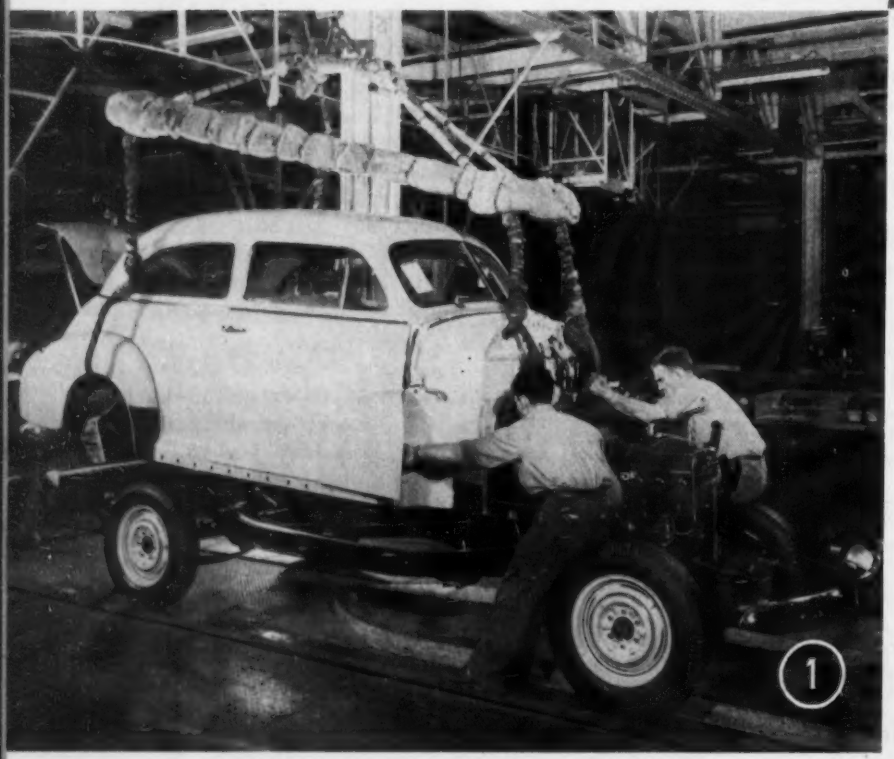
**George R. Perkins,** who retired 10 years ago as manager of blast furnaces, Youngstown Sheet & Tube Co., Youngstown, died Aug. 26 in Evanston, Ill.

Flexibility of Chassis Assembly Widened by

# SUSPENDED CONVEYING SYSTEM

*Two overhead trolley conveyors—one a powered unit running over the other—team up to overcome a mass of small and major handling problems in Chevrolet's new plant. From start to finish a continuously moving line, system frees much floor space; it can be arranged to run at any elevation required for efficient operator performance*

By JERVIS C. WEBB
*Treasurer & Assistant to President*
Jervis B. Webb Conveyor Co.
Detroit



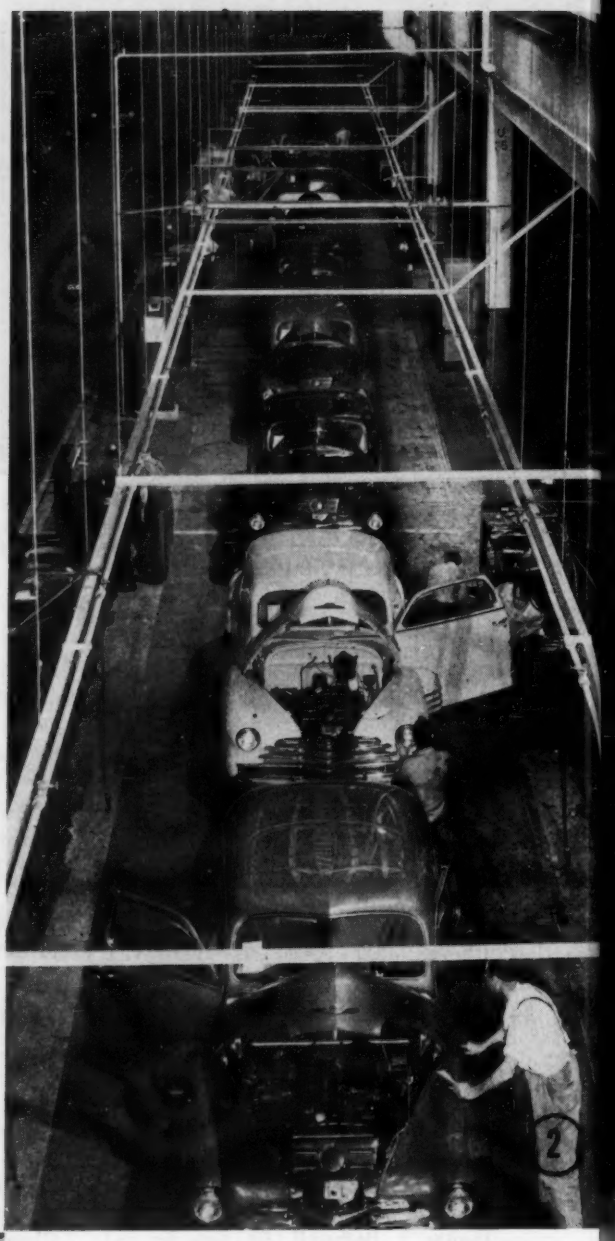




*Fig. 1—View of conventional "drop body", term applied to operation of lowering auto body from an upper floor level to the chassis now traveling on the final assembly line*

*Fig. 2—One of two conventional final assembly floor lines. Several of these "double" final assembly lines are operated in the plant. Each pair is serviced automatically by only one chassis line*

*Fig. 3—Panoramic view of assembly line. This shows the chassis suspended from the overhead power and free conveyor*

BASIC principle—that of continuous mechanical pacing of production—was sought and accomplished to a remarkable extent many years ago in the automotive industry. In the thirties, it was picked up and carried along in household appliance industries and many others. But advent of World War II, and the pressure of its needs for expanded production forced the conveying principle to the forefront.

Conveying systems, for the first time no longer shackled by peacetime cost analysis factors—were given an opportunity to indicate the great cost savings derived from mechanically pacing of production. By providing a positive time flow, from raw materials to shipping room, the conveyor was instrumental in uncovering many cost saving features, including methods of making a higher quality, and more uniform product. It increased individual productivity; enabled operations to be conducted with absolute minimum stocks of work in progress; placed processing on a timed mechanical conveyorized basis, providing high uniform quality and productivity; presented continuously available flexible, moving storage facilities without rehandling; provided a visual means for analysis of the manufacturing system to eliminate bottlenecks and add more facilities; and set up excellent conditions for timing and regulating overall operations scheduling.

Armed with all this newly acquired know-how, and always in the front row whenever plant layout and mass production changes are in order, automotive engineers quickly recognized the possibilities of an overhead suspended conveying system for use in chassis assembly. Such a system, recently installed and now in steady operation in Chevrolet's new assmbly plant at Flint, Mich., is definitely working out satisfactorily, easing and overcoming a mass of handling assembly problems.

Departing abruptly from the conventional prewar floor type assembly conveyor for chassis building, the new line—from start to finish—is a continuously moving line transporting skeleton chassis suspended from overhead trolley conveyors that operate on I-beam rails. The latter are positioned at elevations that keep the conveyor entirely out of the floor plan so far as clearances are concerned. The whole setup follows entirely the principles of mechanical pacing of production.

In the system, referred to as the "overhead power and

free trolley conveyor"—developed by Jervis B. Webb Co., Detroit—the work or chassis to be handled is fastened to a carrier that always remains with the conveyor. The carrier is suspended from a ball bearing free trolley assembly arrangement, equipped with side guide rollers that permit negotiation of horizontal curves. This assembly travels on an overhead double channel track, and is easily moved by hand or gravity.

Located directly above the double channel track is a standard overhead power-driven trolley conveyor. Pusher dogs spaced at intervals and attached to it, extend below the power conveyor. These, as the power conveyor is dipped down to a certain point, engage and trap other collapsible dogs on the free trolley traveling directly below. Thus the free line is pushed along at the uniform speed of the upper conveyor. If vertical rises or curves are to be negotiated, the free trolley cannot run away or stop since it is trapped by the dogs, and thus must proceed at the uniform rate of speed supplied by the overhead line.

When power is no longer required, the upper line is simply sloped upward, freeing the lower free running line. This enables the latter to be shunted off for any switching arrangements. In fact, the free line lends itself very readily to any automatic switching, either to right or left or shuttle operations that may be required away from the "pacing" power line.

At the head of the chassis line, in the Chevrolet plant, men at each corner assemble and tack spot weld together the side panels, rear panel and front axle which comprise the skeleton frame of a Chevrolet car. Their work place is a jig set at normal working height. Simple gravity slides for the panels, trolley hoists for axle assemblies, and trolley supported spot welders and speed wrenches eliminate all lifting and keep tools and subassemblies always at hand.

Upon completion of the initial skeleton frame assembly, at the touch of a push button, one of the conveyor carriers mentioned above is released and travels by gravity on the free line to a point just above the jig. Automatically, a section of track lowers the carrier to a level where it may be fastened quickly to the skeleton frame. The track section then rises vertically to (*Please turn to Page* 112)

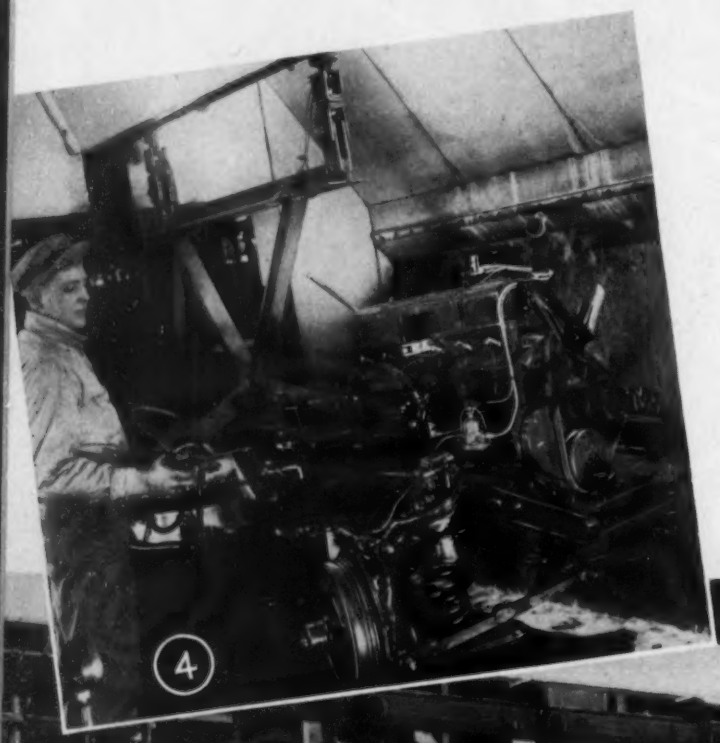
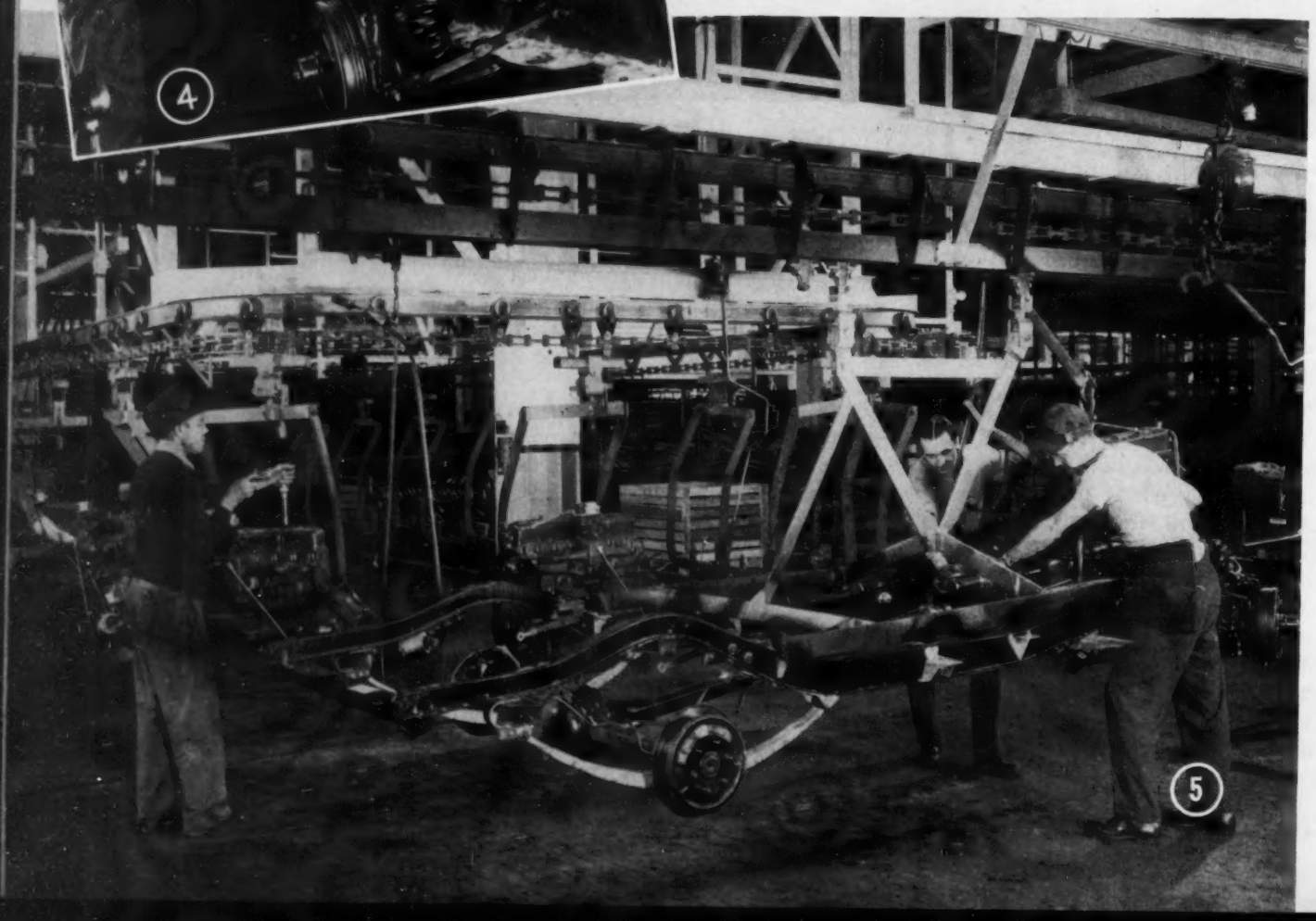


*Fig. 4—Motors which were assembled while suspended from an overhead trolley conveyor are here being transferred to the chassis itself. Note the carrier and how the overhead trolleys—the upper one powered—team up*

*Fig. 5—Painted while proceeding via overhead conveyor, this chassis hangs from a "suspended assembly" track that brings the work along the line at bench level. Note how the overhead conveying system runs clear of the paint spraying area. Paint spray and fumes here are blown away from operator and into water wash at rear*



# Seen and Heard in the Machinery Field

By GUY HUBBARD
*Machine Tool Editor*

**OFF FOR THE BIG SHOW:** Starting at the end of this week the Penton caravan will join the big trek to Chicago—destination, National Machine Tool Show, Dodge-Chicago (Tucker Corp.) plant; time, September 17-26.

This will be one of the greatest "mass-migrations" in the history of our company, and will include not only the top executives of the company, but also key men from the staffs of *The Foundry, New Equipment Digest, Machine Design* and *Revista Industrial* as well as STEEL.

Ours will be typical of thousands of similar caravans which will be converging on Chicago during that period, not only from every state in the Union and from every industrial province in Canada, but also from every foreign country wherein machine tools are active or potential factors in the industrial economy.

The primary objective of the 20 Pentonites who will attend this Big Show will be exactly the same as that of more than 100,000 other "delegates". It will be to become acquainted at first hand with metalworking machines, tools and methods which will determine the course of mass production (including cost of products, employe-employer relations and layout of manufacturing establishments) for many years to come. All this will apply not only to America, but to industry throughout the world.

### Show Will Have Many Interpretations

Just as this Big Show will mean different things to each of the 20 representatives of our company, so also will it be "all things to all men" who attend. Financial men—including bankers—will study the exhibits from the standpoint of what the new equipment means in terms of immediate earning power and continued financial stability of companies in which they are interested. Many of them will be keenly interested in competitive angles brought out by the show—as for instance new and improved processes which threaten the supremacy of entrenched machines and methods, especially of old-line organizations.

Personnel and public relations men will be interested in the study of the new equipment in its intimate relationship to the operator. For example; the "tailoring" of machines to "fit" men and women operators as far as location of controls are concerned; the provisions for quick, safe loading and unloading of work with minimum physical effort; the automatic "programming" of repetitive operations so that tiresome routine will be transferred from man to machine; elimination of noise and "hypnotic" flickering which tend to dull the senses and so lead to accidents; provisions for built-in gaging which will forestall the running off of quantities of faulty work; and dust, fume and mist control which eliminate health hazards.

Designers and draftsmen will study with particular interest various machining and metal forming techniques which should be specified on original drawings and to which attention should be given in basic designs. In the old days when machine shop practice was far simpler than it is today—or will be after this show is over—engineers and draftsmen in many cases were recruited from the shop. Today and tomorrow that shop background is—and will be—even more important than it used to be. This National Machine Tool Show is the chance of a lifetime for the designers and draftsmen of today and tomorrow to gain "shop experience" such as they never could get in any shop except this "world's greatest machine shop".

Tool engineers will study this show from the point-of-view of ways and means for the most effective application of standard machines to special jobs, not only the design and mounting of the actual cutting tools (and their materials), but also methods for holding the work; conveying it in and out of machines; guiding the tools in relation to the work; getting rid of chips so that they will not interfere with cutting, loading and unloading; sharpening and quick replacement of tools and elimination of "down-time" generally; instrumentation in relation to size control and work inspection; and combining of operations to cut machining time and to eliminate rehandling of work. If history repeats itself, a wave of retooling activity will accompany the widespread overhauling of equipment programs which will follow this show.

Plant engineers and production managers will study this show from the point-of-view of its overall effect on the layouts of plants both old and new. With building materials scarce, building costs at an all-time peak, tax rates on the increase and general expenses involved in "running around" of men and materials, economy of floor space is of paramount importance. Many of the new machines occupy fewer square feet of space than do the older models. Many of them are so much more highly productive that fewer of them are required to handle a given volume of output. Many of them are designed for close location in batteries so that one operator can handle two or more without undue effort. Many of them have magazine feeds and are conveyorized so that much less room is required for stocking and removal of work. Many of them have chip conveyors or quick-removable chip pans which simplify cleaning during operation. These and many other features will have vital effect on plant and production layouts of the "post-show" era.

### Competition Will Be Great Stimulant

Last but by no means least, the machine tool builders themselves must study this their own show as hard or harder than any of their good customers. In it lie the seeds of their future success or their future decline—depending on how they interpret the lessons and how they react to them.

Most of them will go to the show with the idea that they are "sitting on top of the world". One swing around the circuit should be sufficient to convince them that their competitors likewise are good. The obvious thing to do is, get back to the booth and concentrate on the most intensive and constructive job of selling to the largest and most receptive group of prospects ever gathered under one roof at one time. The war is over, free competition is back—now it's definitely up to you!

# *Low temperature* Silver Alloy Brazing

***Description of several production techniques used with this method of joining which saw widespread use during the last 5 or 6 years, in some cases, realizing savings as high as 50 per cent***

USE of low temperature silver brazing alloys is increasing steadily, and as they gain in popularity more applications develop wherein they become a definite part of high-speed automatic production methods. The use of brazing alloys containing silver dates back many years but only in the past 5 or 6 years has their use become widespread in what might be considered real high production.

More popular low temperature silver brazing alloys flow in the range of 1145 to 1600° F, the specific temperature depending upon the actual compositions. The other flow characteristics besides temperature of these different alloys vary considerably and it is generally true that the more free flowing alloys have been used to a greater extent on high-speed automatic production operations. One alloy, Easy-Flo, a proprietary made by Handy & Harman, embraces many of the desirable properties of a production brazing material and reference will be made to applications where this composition has been used.

In any discussion on brazing, particularly production brazing, some consideration must be given to the different methods that are employed to heat the parts to brazing temperature. One of the most commonly used and most versatile methods of heating is the use of the oxyacetylene torch. It is reported that today over 63 per cent of the manufacturers doing low temperature brazing employ the oxyacetylene torch for their heating.*

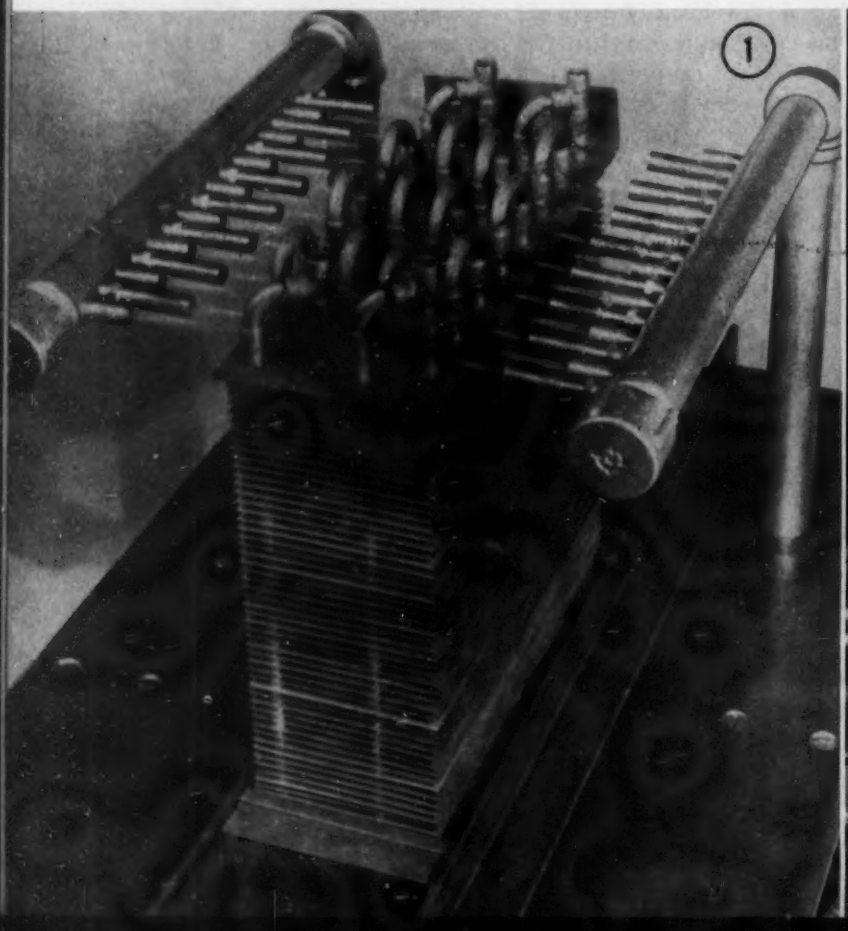
Hand operated torch is used in the early stages of the development of an application, on pilot runs or even on small scale production. It is always considered where the heat must be taken to the work, one of its chief assets. It is simple to handle and operate, convenient and very flexible. Another distinct advantage is the ability to heat work uniformly with it.

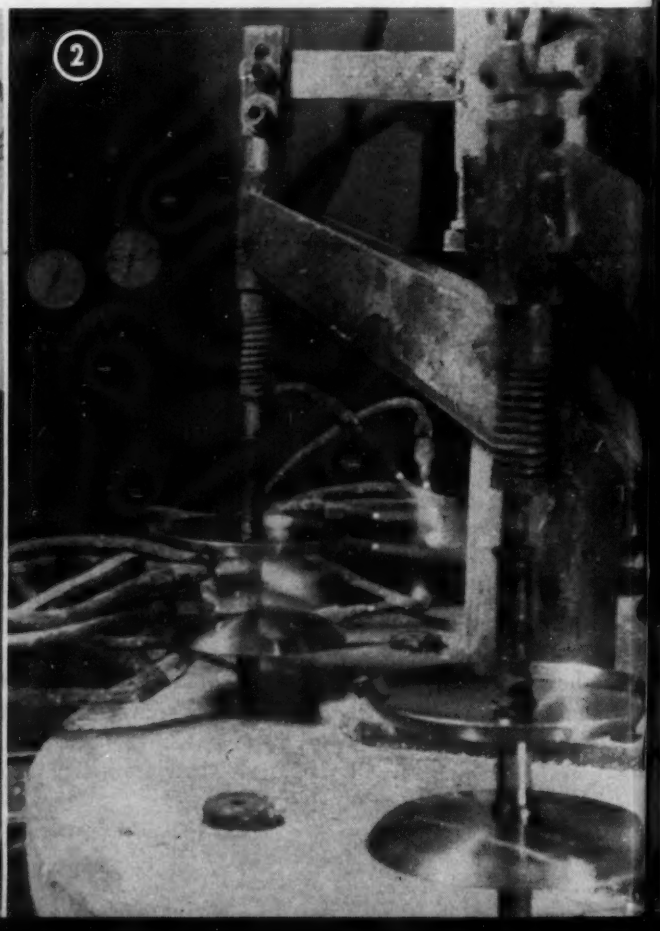
It is possible when using a torch to overcome the tendency of overheating one member of a joint in order to raise the temperature of the adjacent member sufficiently to cause good flow and wetting of the alloy. This faulty condition of unequal heating is more pronounced particularly with the high speed methods of heating. In the operation of the torch, it is moved about, thus permitting uniform heating of the work.

An intermediate process between that of hand torch brazing and fixed burner brazing (discussed later) is the

*"A Special Study on Brazing," prepared by STEEL, market research department.





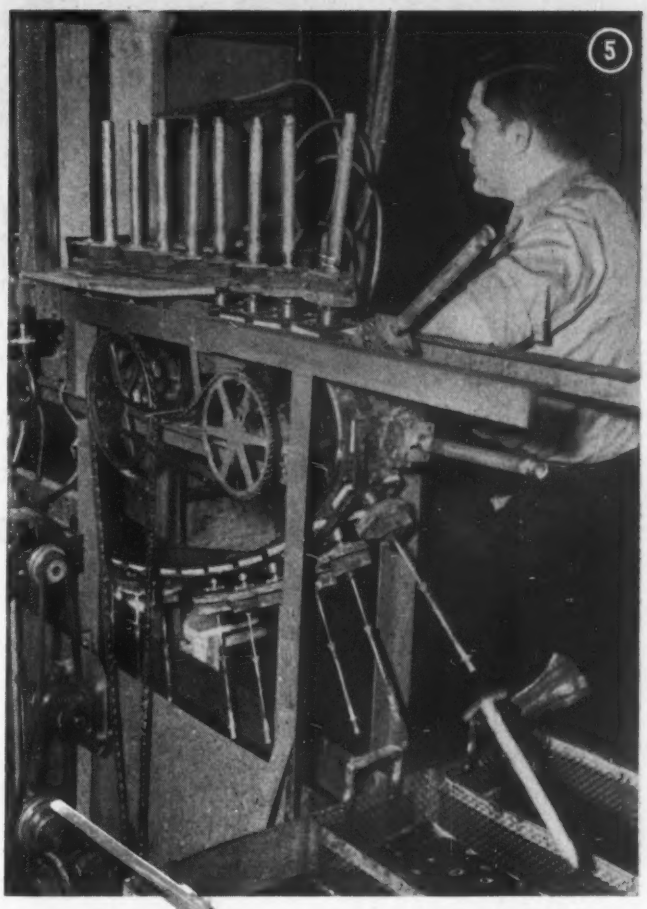



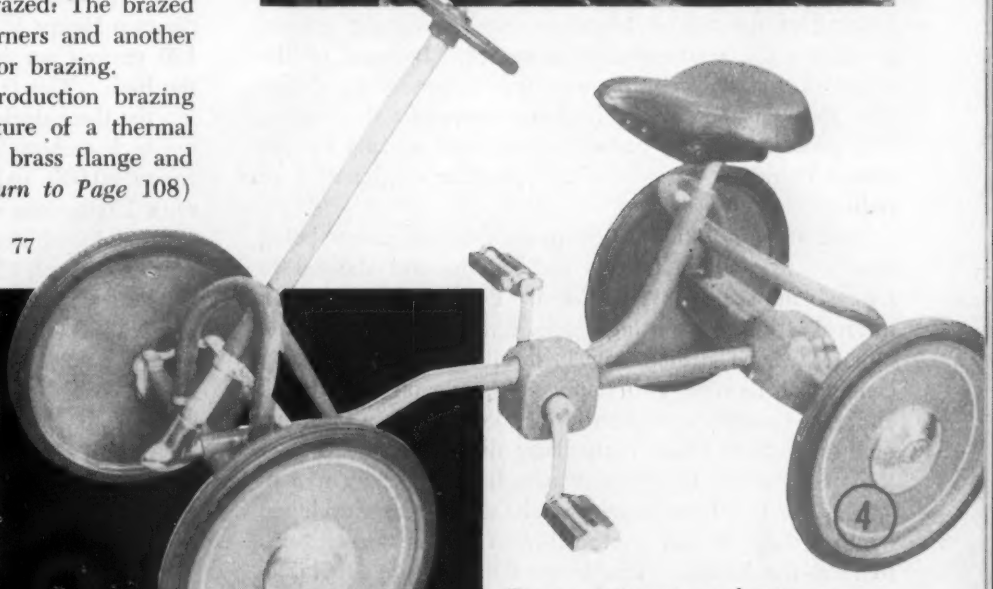
use of a permanently fixed torch for production brazing. An example of a semiautomatic control set-up for production brazing with preplaced alloy is a special 3-tip assembly, utilizing oxygen and acetylene, used for heating three bosses to be brazed to a steel cover for electrical connection boxes. With this assembly, it is possible to heat the three bosses simultaneously, the flames being applied from beneath the cover plate.

Fixed burner method of heating, employing gas and oxygen or gas and air or oxyacetylene, is looked upon today with considerable favor because it is relatively inexpensive to install and flexible in its applications. An interesting application of using fixed burners utilizing gas-air for high speed production brazing is shown in Fig. 1. While this manufacturer happened to use gas and air, either propane or other suitable gas and oxygen could have been used equally well. Sixteen 3/8-inch copper return bends or a total of 32 joints are brazed simultaneously in 45 seconds on a refrigeration coil. Rings prepared from 3/64-inch diameter low temperature silver alloy brazing wire are inserted into each end of the return bends after which they are assembled in place over the cleaned and fluxed tube ends. Two manifolds are used in parallel with 16 burners in each manifold staggered so that each joint is heated uniformly and for a predetermined length of time. The time is governed by a positive automatic reset timer and solenoid valve that shuts off the main gas supply leaving a pilot burning after the unit has been properly brazed. The brazed assembly is then moved out of the burners and another assembled unit is indexed in position for brazing.

Another interesting application of production brazing using fixed burners is in the manufacture of a thermal coupler unit as illustrated in Fig. 5. A brass flange and a copper plug are brazed to (*Please turn to Page* 108)





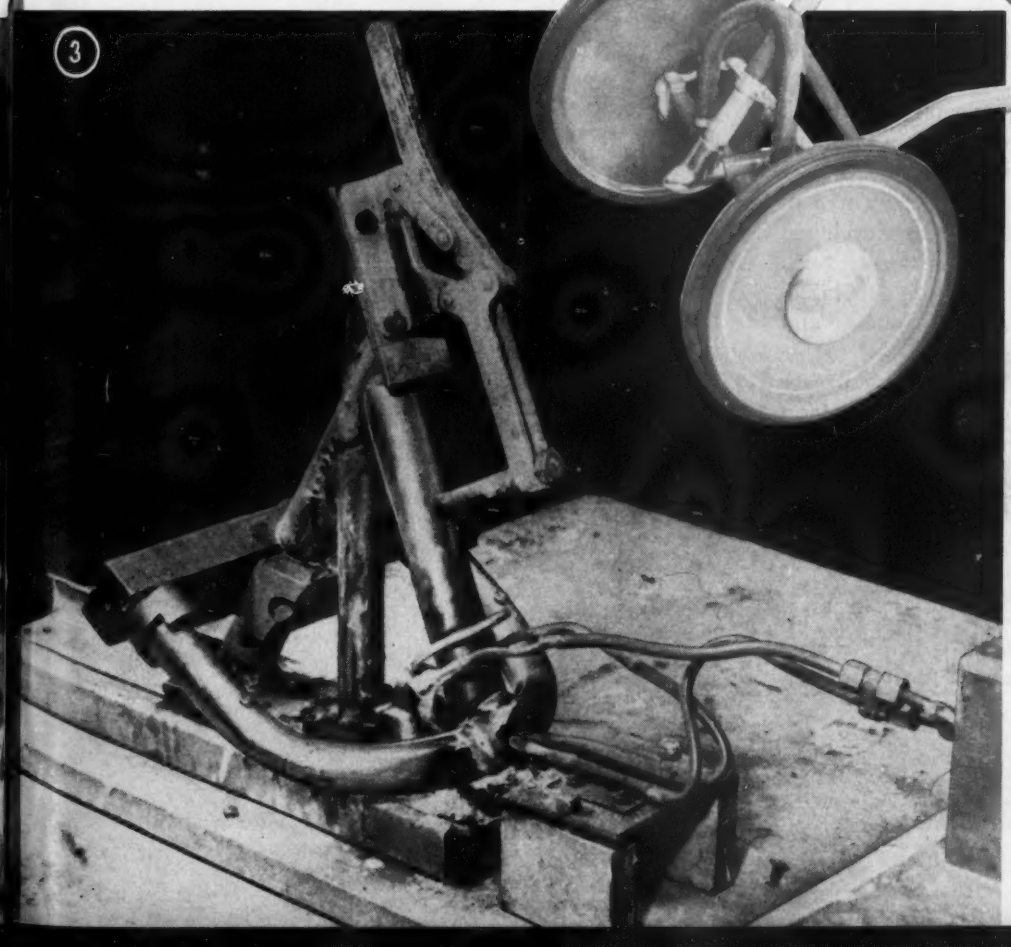




*Fig. 1—Automatic production arrangement for brazing return bends utilizing fixed burners burning gas and air. Sixteen ⅜-inch copper return bends or a total of 32 joints are brazed simultaneously in 45 seconds on this refrigeration coil*

*Fig. 2—Rotating table used in handling the parts of a fishing reel assembly being brazed*

*Fig. 3—Movable fixture employed for brazing front support member of 4-wheel cycle. Burner is guided into position*

*Fig. 4—Completed 4-wheel cycle, 11 joints of which are silver alloy brazed*

*Fig. 5—Oxyacetylene brazing of thermal coupler parts on a continuous conveyor*

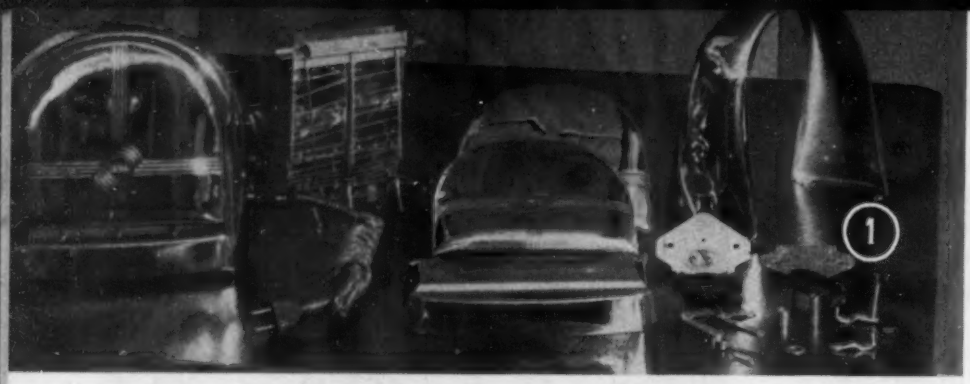


*Fig. 1—Toaster with main components*

# UNCONVENTIONAL

## ...FACILITATE DIFFICULT F

MANY examples of enlightened engineering, tooling and shop practice are evident in the St. Louis plant of Knapp-Monarch Co., manufacturers of electric toasters, irons, hair dryers and some 100 other items. In this plant the company accomplishes a flow of nearly 100,000 separate major parts, policy being to fabricate most of the finished products from raw material.

Among the many other small electric appliances, the company produces a 500-w 115-v, turn-over toaster. Finish forming of the toaster frame involves compound curves, peculiar radii, contouring complexities. Because of the shape of the finished frame it was necessary to design dies that vary considerably from conventional practice. The problem was to prevent spring-back caused by the severe stamping hazards of the peculiar combination of radii.

Steel used is 0.035-in. deep draw stock, sheets being received in random lengths and widths and sheared to rough blank size of 6½ x 19¾-in. They are then blanked to an odd looking starting shape, having a double-paddle appearance. The first draw in forming the toaster frame consists of forming two depressions, one on each blank end. The second operation forms the frame in a U-shape, neither of these being particularly difficult. The die for the second draw, however, departs from the conventional.

This die is a heat treated Meehanite casting developed by the company and equipped with air pressure fixtures to hold the blanks. The frame takes a high chromium finish polish and must be free from all scratches and buckles. Rejects run less than ½ per cent.

The sequence of operations in fabricating the toaster frame is: (1) Shear, (2) blank, (3) first draw, (4) form U-shape, (5) second draw, (6) trim door openings and provide two special locating lugs for subsequent positioning, (7) trim and perforate feet. This is accomplished one side at a time in a work and turn feed. The part is a little clumsy to handle, being fed in and reversed; yet production of 300 per hour is achieved. Operation (8), form feet and short flange on the end of the frame to gain extra stiffness; (9) trim off locating ears; (10) perforate terminal hole and handle holes in a two-station die.

Another example of steel working is the fabrication of the rotor for fractional horsepower induction motors, used particularly in hair dryers and electric fans. Rotor and field are blanked from one strip in a 5-step progressive die in a Henry & Wright automatic machine, operating at 120 strokes per minute. Punches are mounted solid in the bath. This is different from the usual practice which lets the three-decker die float, guided by the stripper. Dies are high carbon, high chromium tool steel, producing between 80,000 and 120,000 pieces per grind. Field and rotor laminations come from this die press, automatically separated and stacked in 30 in. long sheets. These are racked in trays, Fig. 4.

The trays of rotor laminations come along to a manual magazine feed which prepares them for assembly in vary-

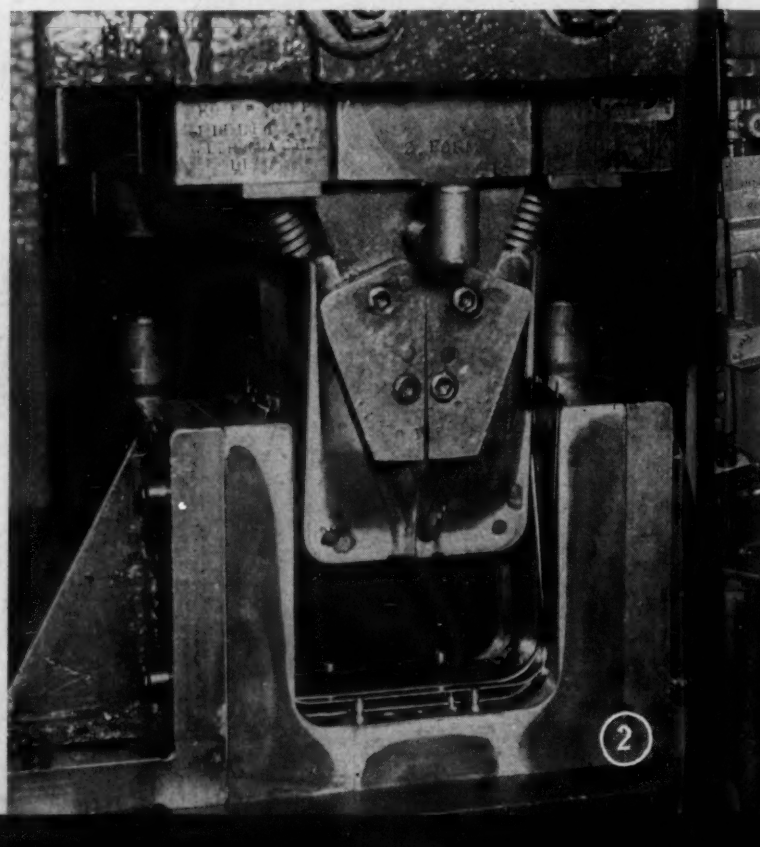


*Fig. 2—Close-up of expanding die on powerful straight side press stamping out toaster frames*

*Fig. 3—Burner wells being stamped here will eventually find their way into grill stoves*

By GERALD ELDRIDGE STEDMAN

# AL DIES

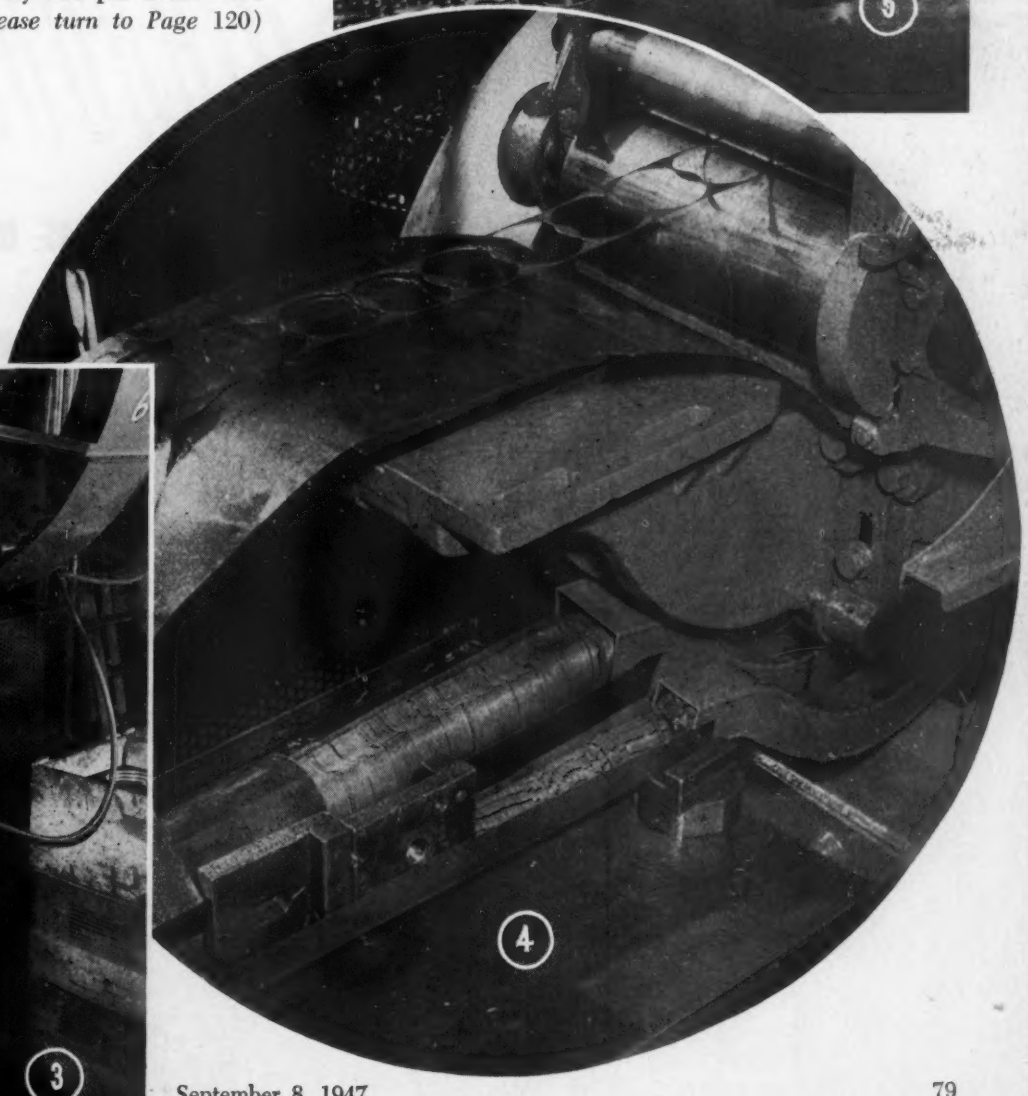
## LT FORMING OPERATIONS

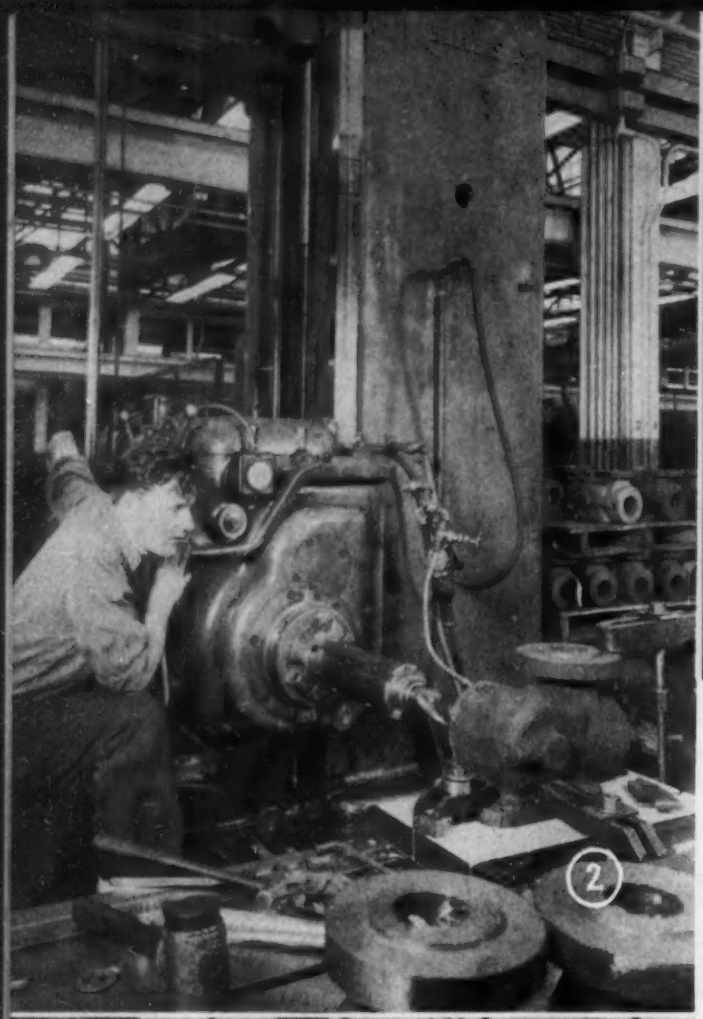
ing thicknesses from ¾ to 1¾-in. This is a time-saving tool of K-M development. Copper rivets are then manually installed, from 13 to 21, depending upon rotor capacities. Smallest rotors are for the 8-in. fans and hair dryers, larger assemblies for 10-in., 12-in. and 16-in. fans. See Fig. 5.

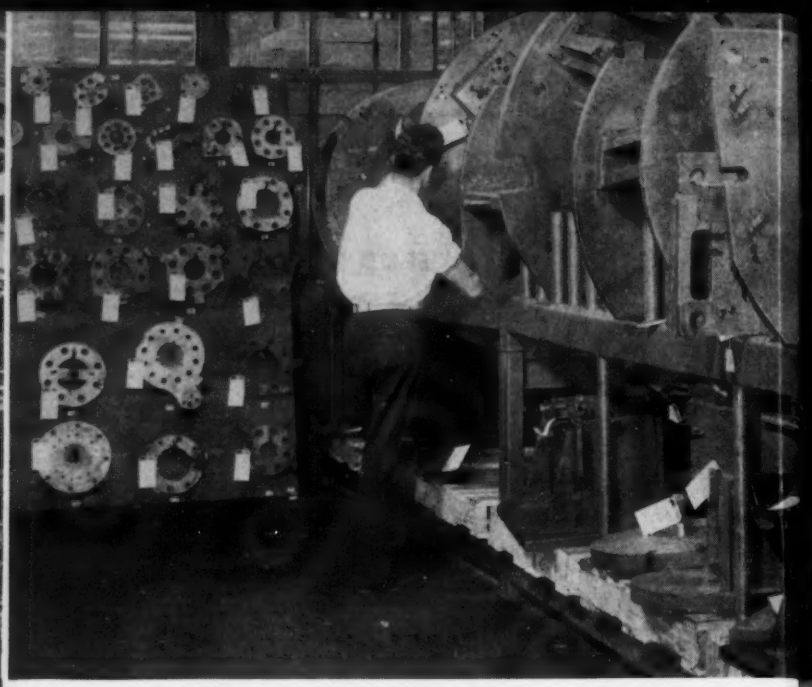
Work then moves to a standard punch press which employs a special die that rivets and gives spiral twist at one stroke of the press. The press operates at 35 strokes per min and production is approximately 500 per hour. The serrations of the upper and (*Please turn to Page* 120)

*Fig. 4—Field and rotor laminations coming out of press are automatically segregated in separate positions. Rotors are at lower right, while fields are at left*

*Fig. 5—Assembly press for mounting copper rivets in rotors*

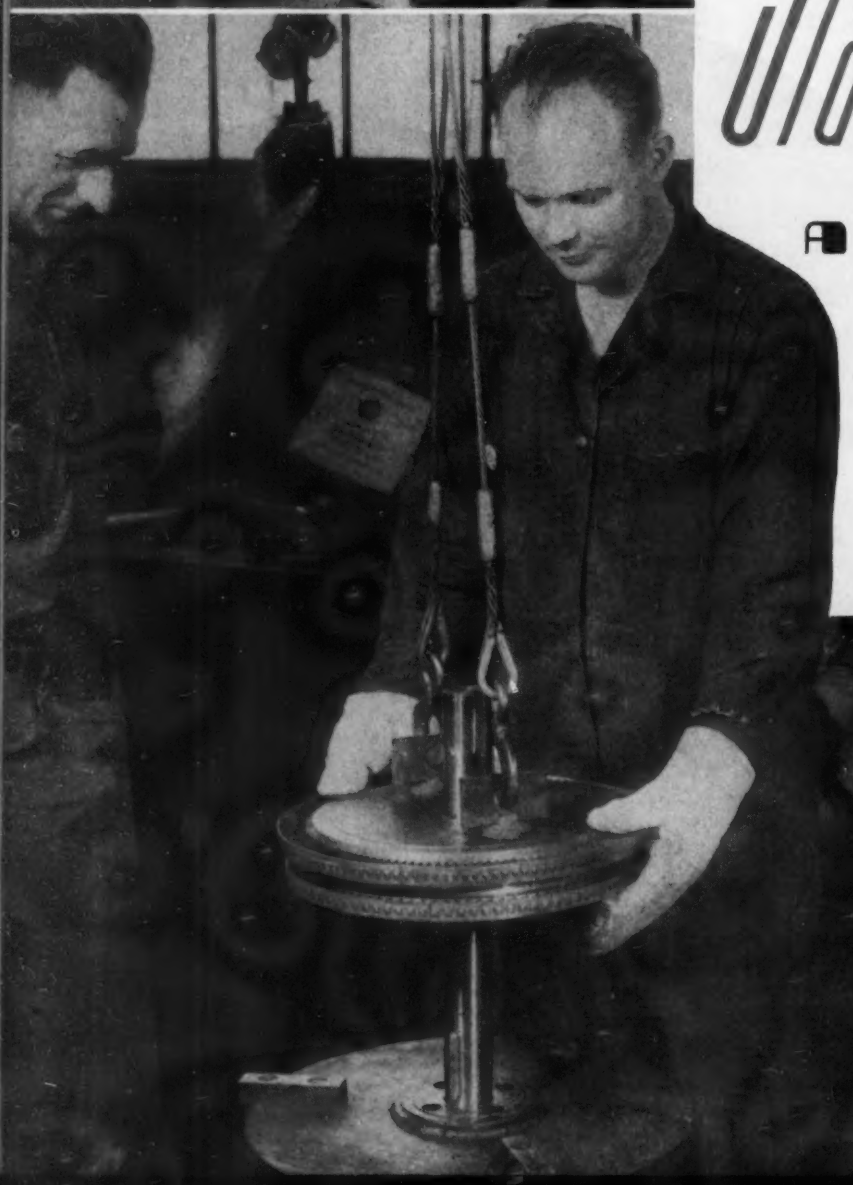


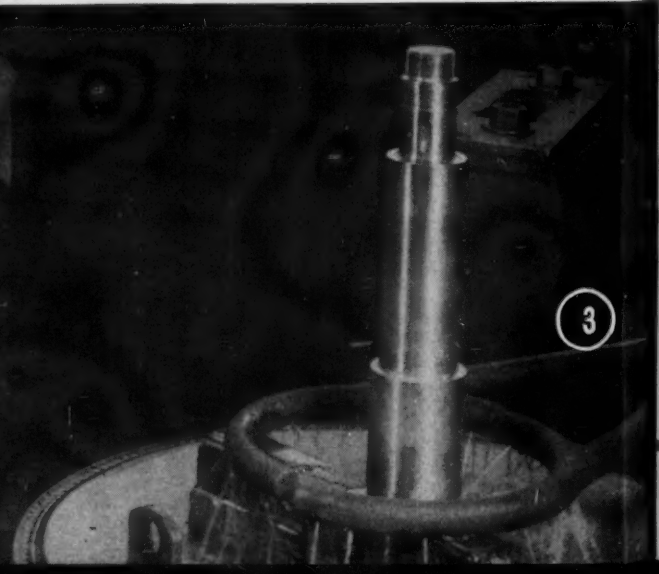


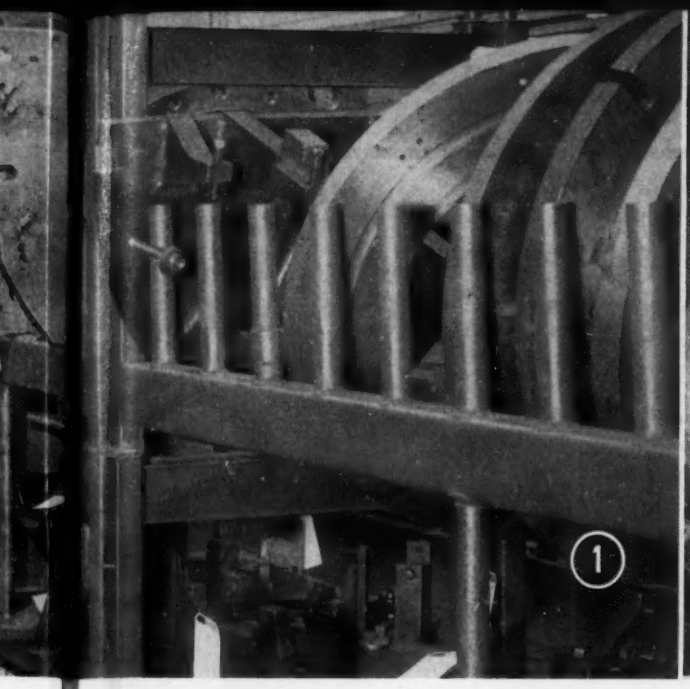


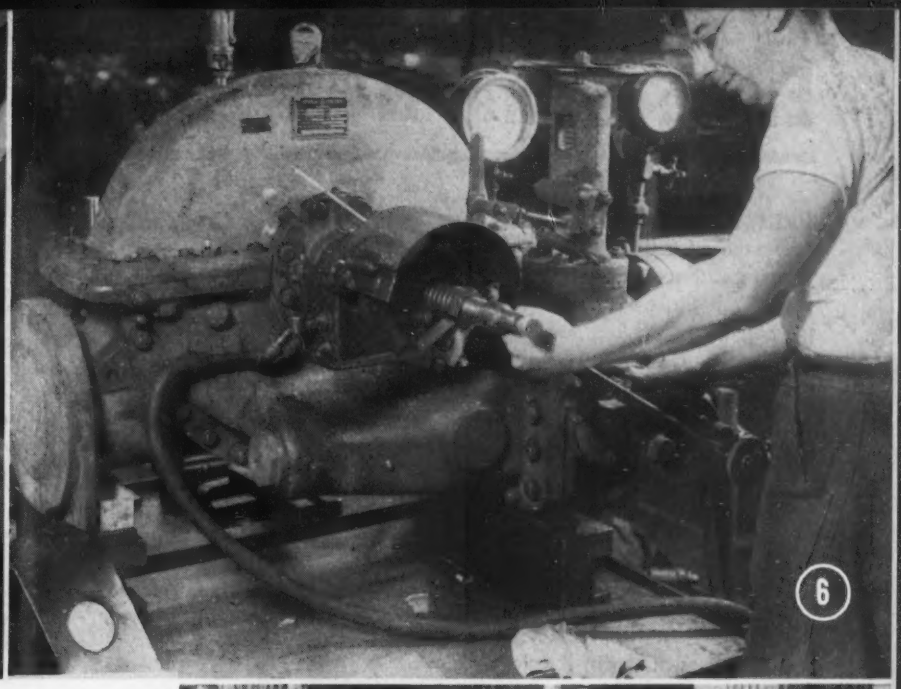
# Standardization

## ACCELERATES TURBINE OUTPUT









AS a result of standardization of design, production of single-stage, shaft-governed turbines for ratings up to 800 horsepower is now at an all-time high at the Fitchburg, Mass. plant of General Electric Co. In addition, standard parts are enabling the company to make faster deliveries—often as early as 15 weeks. Standardization eliminates special calculations and drafting, streamlines factory operations and permits stocking of practically all component parts.

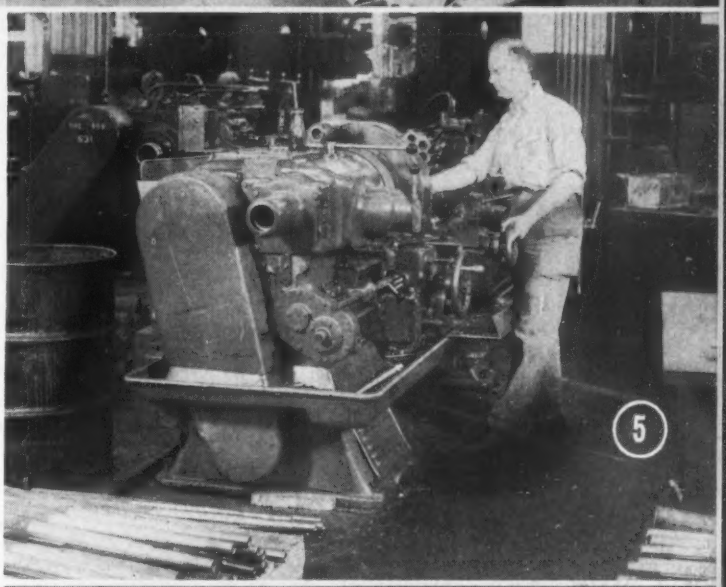
With most of the required components available in the storeroom, only 5 or 6 hours' engineering work is necessary before a turbine order is turned over to the production people. Only special paperwork required by the production group is that calling for nozzle plate, operating valve and valve seat data. Turbines are assembled directly from stock cage material issues. As stock room quantities reach set minimum values, additional parts are brought through in lots ranging up to 100.

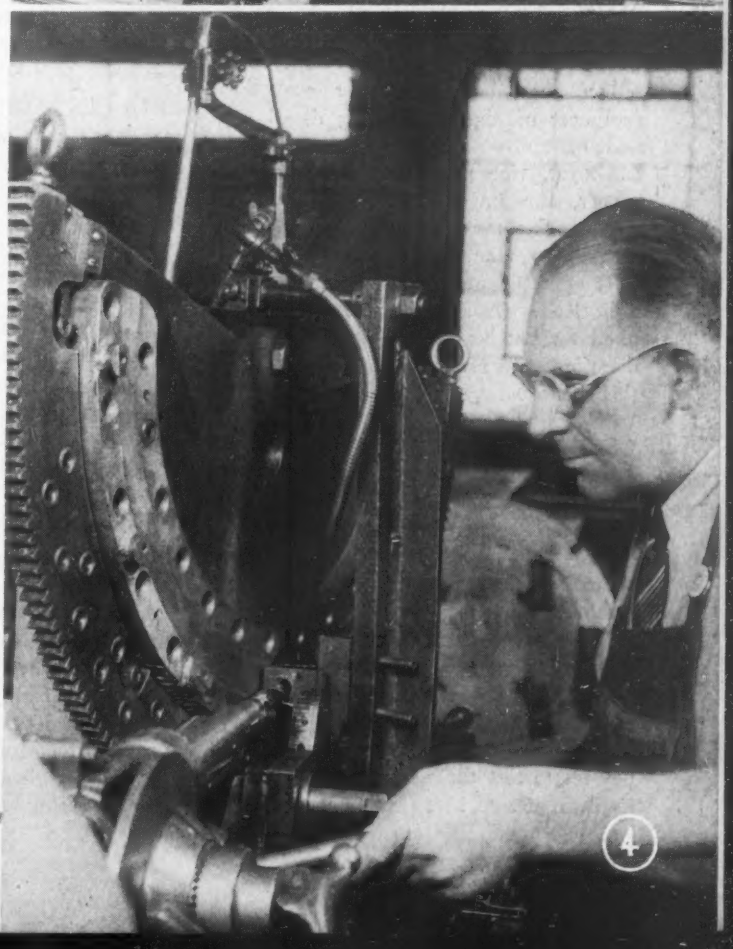
Some steps in the production of the turbines are illustrated by the accompanying photographs. Workman, Fig. 1, is selecting a large jig to be used in machining operations for turbine parts. Jigs and fixtures to left of worker are used in machining smaller turbine components.

Governing valve body is shown being machined in Fig. 2. Final work, consisting of inserting and finish-machining the valve-seat, is one of the few operations performed especially for each order. Turbine wheel at the left, Fig. 3, has been heated and is being lowered onto the shaft. At right, water spray is cooling a wheel to make it shrink tightly to the shaft. Nozzle plate is being drilled in Fig. 4. This is one of the few "tailor-made" operations required to fill specific orders.

Turbine shaft is turned down on semiautomatic lathe shown in Fig. 5. Number of partially-machined shafts in foreground indicates the emphasis on quantity production. Turbine buckets are machined in automatic milling machines. They are turned out in quantity lots, then stored in stock room, ready for quick issue on turbine orders.

A completed standard, mechanical-drive turbine, Fig. 6, is adjusted just before starting the unit on test.





# Engineering News *at a Glance*

**PRESSING UNDER VACUUM:** To overcome difficulties of atmospheric compressing sintered carbides and metal powders, F. J. Stokes Machine Co., recently perfected a machine and technique in which compressing is done under vacuum pressures that are varied to meet specific conditions. According to the company, elimination of air produces pieces which would ordinarily laminate due to air cracks. Press used in the operation applies a maximum of 20 tons pressure from above and below. It has a die fill of 2⅝-inch, and produces pieces up to 3 inches diameter. Pressure from above is exerted by an adjustable eccentric crank and on the lower punch by cam action. A vacuum chamber surrounds the die table, the punches and feeding device.

**STRONG RAIL DESIGN:** Newly developed rails now being used by Pennsylvania Railroad to replace those in service look very much like the conventional rails except the metal is better utilized by means of longer, sweeping curves connecting the underside of the railhead with the "web" or vertical middle part of the rail. Upper portion of the web itself is thickened to better resist the forces of trains rounding curves. Heaviest of the new rails—those used to carry the heaviest traffic—weighs 155 pounds to the yard, compared with the former 152-pound conventional rail.

**MAKES FUEL STRETCH:** In Mount Vernon, O., Cooper-Bessemer Corp. reports an engineering achievement that reduces as much as 72 per cent the fuel cost of engines burning diesel oil and natural gas. According to Ralph L. Boyer, vice president and chief engineer, the improvement makes these engines the most efficient power unit created by man, regardless of whether it is operated at its full capacity or at light load. The company recently applied for patents on the development—therefore is not ready to reveal how this fuel economy is reached.

**LIGHTNING ENGINEERS AT WORK:** Armed with traps that virtually pick lightning from the sky, Westinghouse engineers are again on a stalking expedition—in search of more information about thunderbolts. One of the most elaborate traps recently reset is mounted 535 feet above the ground, on the roof of the University of Pittsburgh's Cathedral of Learning. Here, when lightning strikes a steel mast on top of the building, it is channeled through protective devices to test their efficiency. It takes its own picture in an automatic camera and leaves "fingerprints" on the high-speed and slow-speed wheels of fulchronographs, that can be taken to the lab for study.

**SWITCHBOARD "SWITCH:"** An intricate electrical control board for three slab reheating furnaces soon to be remodeled at Carnegie-Illinois Steel Corp.'s Irvin Works is to be replaced while normal production schedule is maintained. The work, being done by Allegheny Industrial Electrical Co., Pittsburgh, under a $27,000 contract, requires setting a precise schedule following detailed advance preparation for making the "switch" during a normal weekend production shutdown. Increased heating capacity of the remodeled furnaces at the 80-inch strip mill necessitated the installation of the new board. Furnace remodeling is being done by Rust Furnace Co. of the same city.

**SNOW MELTING ROOF:** In Pittsburgh, A. M. Byers Co. reports the first structure in the United States in which a snow melting system is incorporated in a roof or marquee is the 6-story People's Savings Bank now being built in Providence, R. I. Wrought iron pipe grids or coils are used in the system for circulating hot water which in turn maintains surface temperatures above freezing to melt snow. Automatic controls enable the system to go into action whenever snow falls. Antifreeze is also used in the water to prevent the system from freezing during snowless frigid weather.

**REDUCES ACCIDENTS:** Safety demands on part of union executives together with efforts of companies to reduce rail accidents are focusing increasing attention on an automatic coupler manufactured by Train Pipe Connector Co., Cleveland, the company reveals. Besides being suitable for coupling cars on class A railroads, the device also can be used to "hook up" hot ladle, cinder pots and slag cars in service around steel mills and blast furnaces. About 1000 cars on one railroad are thus far equipped with the automatic unit.

**"OBSERVING" CAMERA:** Applications of its famous wartime radar oscilloscope recording camera is extended by Fairchild Camera & Instrument Corp., Jamaica, N. Y., to include marine navigation and industrial fields. Referred to as the Mirar camera, it provides, for marine navigation, legal evidence of collision, by recording successive radar images showing vessel relationships in congested waters during all weather conditions. The photos also form the basis for accurate charts of harbors and inland waterways. Industrially, the development can be used to record stationary positions on any oscilloscope, preserves instrument readings at given times and offers protection photography for plants. The camera takes scans every 10 seconds, every minute or every 5 minutes for the average rate of radar scanning. It consists of a camera body, a magazine accommodating 35-mm roll film and a periscope for transmitting, by mirrors, images to the camera lens.

**STILL KEEPS ROLLING:** A link has yet to be replaced in a brazing furnace conveyor belt in use at Beech Aircraft Corp., after more than 8600 hours of service at 1300 to 2040° F temperatures. Used to carry a variety of aircraft parts through brazing operations, the Inconel belt began its tour of duty in 1945, operating every day except for one 30-day period. Working temperatures often reach 2040° F. Standby temperature, when the furnace idles, is a steady 1300° F. The belt was supplied by Electric Furnace Co., Salem, O.

**WIDE TRANSITION RANGE:** Transition temperature of steel plates—temperature at which mode of failure changes from ductile, shear type to a brittle, cleavage type—may vary from freezing to well above room temperature according to a series of tests to determine causes of cleavage fractures in ship plates. According to a report made by the University of California for the Office of Scientific Research and Development and the Navy, materials used in the research were three lots of semikilled hull quality steels. Two of these were of medium carbon and manganese content, tested in as-rolled condition, while the third was of somewhat lower carbon and higher manganese content, and was tested in the as-rolled condition and also after receiving a normalizing treatment. Tests on two lots of steel of essentially the same chemical composition except for nitrogen content revealed that the steel with higher nitrogen had considerably higher transition temperature. Microstructure of the steel with higher transition temperatures was also considerably coarser. No appreciable difference in transition temperatures was found when one lot of steel was tested in the as-rolled and in the normalized conditions. Improved metallurgical structure of another lot of steel, accomplished by requenching and redrawing at a lower temperature resulted in lowering of transition temperature and an increase in ability to absorb energy.

# REVERE COPPER for TANKS

PROBABLY the first important industrial application of Revere copper sheet was in the boiler of one of Robert Fulton's steamboats. For tanks, boilers, water heaters, evaporators, fractionating columns, stills and other equipment copper is still the preferred metal.

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Revere copper and copper alloys are produced in sheet and plate, roll and strip, rod and bar (including welding rod), tube and pipe, extruded shapes and forgings.

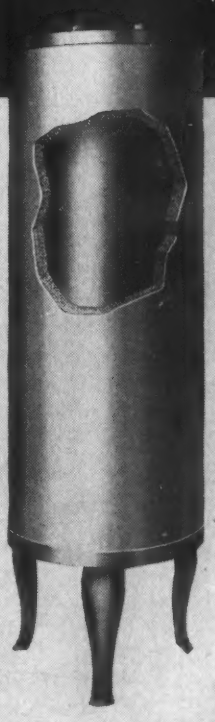

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*Fig. 1—Typical patterns obtained with monochromatic light*

# Photoelastic Stress Analysis

***Polariscopic principle—method of observing distribution of stresses throughout a loaded object by passing polarized light through transparent model assumes logical role in design laboratory of English Gear works***

SUCCESSFUL tests on a polariscope, designed and constructed by the David Brown & Sons Ltd., Huddersfield, England, Park Works research department for its own photoelastic stress analysis of machinery components, have not only made a valuable contribution to the engineer's knowledge of stress distribution but will probably have a profound effect on design of new products, particularly in the cutting tools, airplane and automobile fields.

While the principle of observing distribution of stresses throughout a loaded object by passing polarized light through a transparent model was established almost 40 years ago, it has been kept in the confines of the physics laboratory until recent times, and largely because of the lack of suitable photoelastic materials, has been denied its logical role in the designer's office.

The polariscope lends itself admirably to the study of stress concentrations in gear teeth and the determination of the most suitable tooth proportions for optimum strength. Remembering that light travels in wave form, a beam of ordinary white or monochromatic light can be thought of as a series of vibrations in any number of directions transverse to the direction of the beam. It is possible to dampen or to eliminate all vibrations except those parallel to one plane, when the light is said to be plane-polarized.

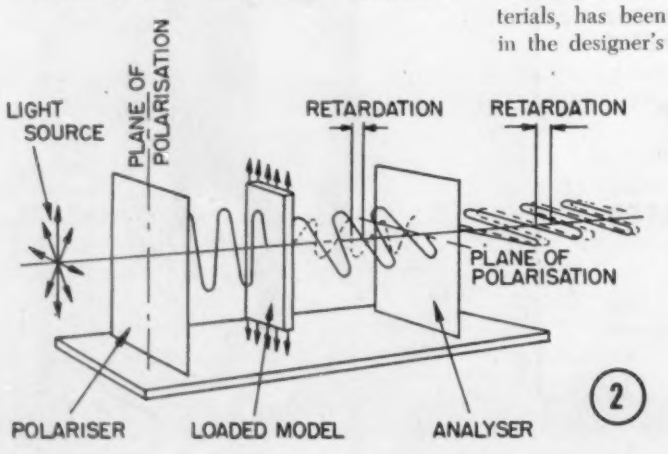
If plane-polarized light is passed into models made of a suitable transparent plastic material such as glyptol polymer or phenol-formaldehyde resin it splits into two rays vibrating in the directions of the principal stresses but at different velocities, Fig. 2, a phenomenon known as double refraction. When these two components after emerging from the model are recombined by passing the light through an analyzer, interference takes place if they are out of phase.

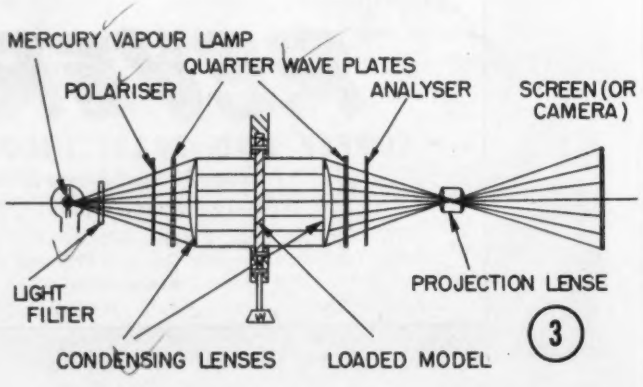
An image of the model projected on a screen will reveal this interference as a series of brightly colored lines intersecting the image. These lines are known as isochromatics, and if a monochromatic light source is used they are shown as black lines only. The extent to which the two light components are out of phase at any point in the model depends on the amount of retardation of each of the two at that point, and this in turn is governed by the magnitude of the two principal stresses at that point.

When the plane of incident polarized light coincides with the direction of one of the principal stresses, the light passes straight through the model and is cut out by the analyzer, resulting in a black line on the screen. Lines of this nature are known as isoclinics and are useful for determining the directions of the principal stresses. If isochromatc lines only are wanted, the isoclinics may be removed by using a quarter-wave plate

*Fig. 2—Illustration of optical theory*

*Fig. 3—Diagrammatic arrangement of polariscope*



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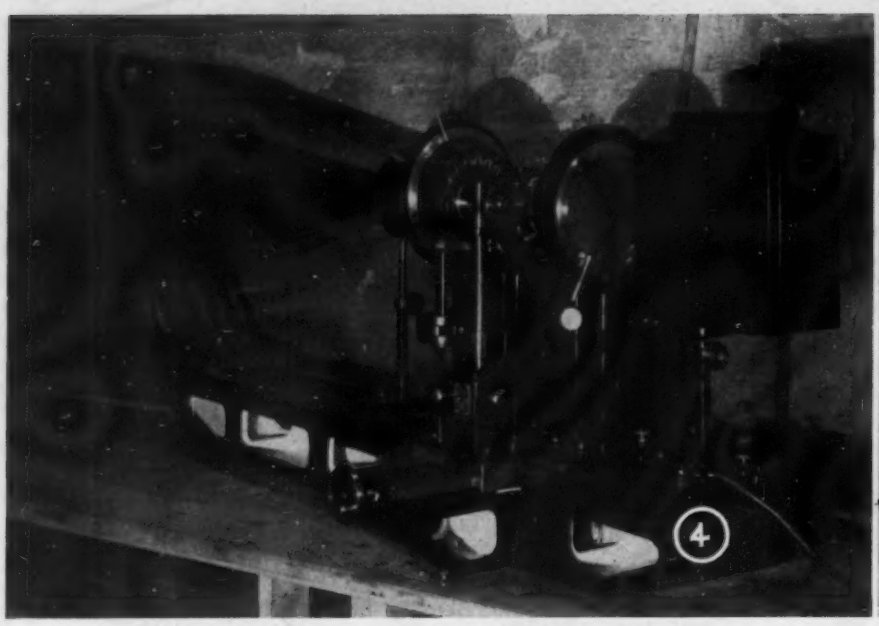


*Fig. 4—Polariscope made by David Brown research laboratory*

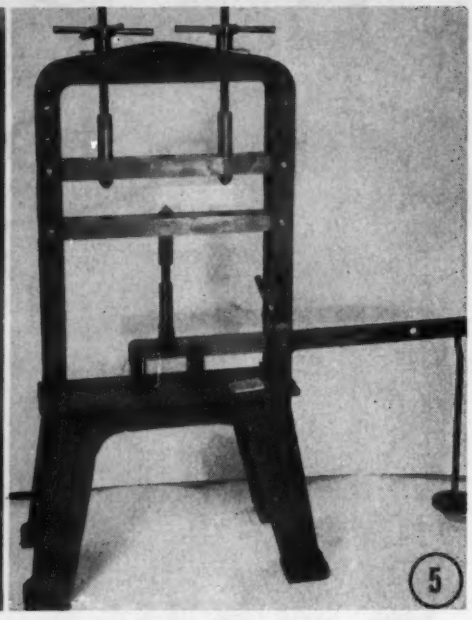


*Fig. 5—Universal stress frame can be adapted to produce tensile, compressive or bending stresses*

on either side of the model between the polorizer and the analyzer, a quarter-wave plate being a plate of double-refracting material which retards the light components by one quarter of a phase.

The arrangement of the polariscope made by the David Brown research department is shown in Figs. 3 and 4. The polarizer and analyzer are almost identical in design, each consisting of a 6-inch diameter sheet of polaroid and a mica quarter-wave plate mounted in circular holders. Either may be rotated through 360 degrees, the rotation being measured by graduated scales. The quarter-wave plates are readily detachable. Two condensing lenses, each 12 inch focal length, are used. If photographic records are required, the ground glass screen is substituted by a camera. Illumination is by a 250-watt mercury vapor lamp mounted in a lamp house bearing an adapter to carry the filter that is necessary when monochromatic light is wanted.

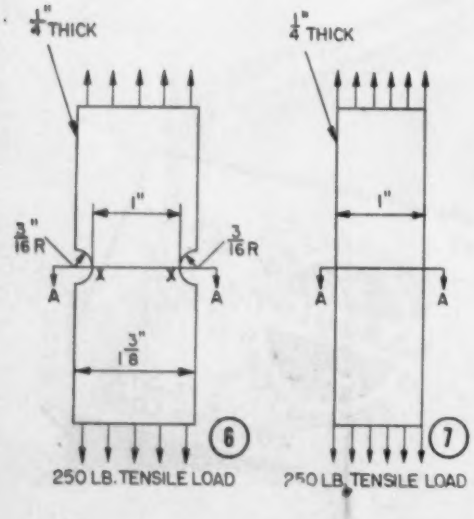
The frame in which the transport model is subjected to stress is carried on an adjustable table between the condensing lenses. Fig. 5 is universal stress frame which can be adapted to produce tensile, compressive or bending stresses.

To make a stress analysis, load proportional to those acting on the real object are applied to a model made to scale out of a suitable transparent material and the patterns of isochromatics and isoclinic viewed in the polarizer. Typical patterns obtained with monochromatic light are shown in Fig. 1.

### Determines Stress at Given Point

Since isochromatic lines are dependent on the magnitude of principal stresses in the model and isoclinic lines give directions of the principal stresses, the designer can determine from them the stresses at any given point in the model and, consequently, in the actual component.

Much can be learned by visual observation of the isochromatics alone. Just as crossing the contour lines on a map will indicate an obverse or reverse gradient, so crossing the isochromatic lines indicate movement from a region of low stresses to one of high stress, and vice versa. A sharp change of stress value is indicated therefore by a concentration of isochromatic lines. As an example, Fig. 1 shows that the stresses in each of a pair of gears in contact are concentrated at the tooth fillets and at the point of contact. Stress distribution in similar models will be the same regardless of the material of which the model is made, provided, however, that only elastic stresses are considered.




*Figs. 6 and 7—Tensile loaded parts illustrating possibilities of photoelastic stress analysis*

Simple example of possibilities of photoelastic stress analysis is provided by an examination of a component similar to the one illustrated in Fig. 6 and subjected to the loading conditions specified. To ascertain the maximum tensile stress in such a component most designers would select the minimum cross-sectional area (i.e. on section AA) and divide the load by this area, thus obtaining a maximum tensile stress of 1000 psi. In other words, the component would be considered as if it were a plain strip in tension, similar to the one illustrated in Fig. 7. But photoelastic analysis proves that maximum tensile stress would occur at the two points marked X and would be as much as 2050 psi.

One of the recent photoelasic investigations at Park Works into the stresses in gear rims arrived at two interesting conclusions: (a) That the thickness of a rim may be reduced to a value equal to 0.6 of the circular pitch of the gear without appreciably reducing the breaking strength of the rim; and (b) that the practice of securing a gear rim to a center by means of grub screws does not appreciably reduce the strength of the rim provided the size of the grub screws is kept below a certain limit.

It was seen that for each gear (neglecting the point of contact) the point of maximum stress was always at the fillet at the root of the noncontacting flank of a loaded tooth, or, in other words, the weakest point was at the compression fillet of a loaded tooth, reaching its height when the point of contact between the gears coincided approximately with their pitch point.

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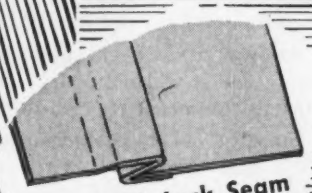

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# Lubricating Wire Rope

By J. A. RIGBY
*Chief Engineer*
Brooks Oil Co.
Pittsburgh

***Proper care and correct lubrication are essential to realize best values and endurance of steel cable***

LUBRICATION of wire rope may be divided into two classifications—lubrication, and protection. It should be clearly understood while "good lubrication" usually affords some corrosion resisting protection, "good protection" does not necessarily insure thorough lubrication.

Function of lubricant is to provide a film covering of the bearing surfaces to preserve the hemp center so that the elasticity and resiliency may be retained, and to prevent the formation of "corrosion pitting", which will quickly break down the original physical properties of any wire.

Use of a protector is to preserve the lubricant, and to seal the rope in order to prevent moisture and corrosive influences from penetrating into the rope. Ropes that operate in wet mine slopes and shafts are an excellent example of the advantage of a protecting lubricant.

Basically, therefore, the ideal or versatile wire rope lubricant is one having the combination of lubrication and protection, but also one containing other essential characteristics.

Wire rope in service will only produce the best values and endurance with proper care and with efficient lubrication. This involves good engineering design for the application with careful consideration to the correct size of the drums and sheaves.

Expected life of wire rope aside from proper care, is affected greatly by variables such as load factors, speeds, shock conditions, and contamination action by water, acids, salt water and atmospheric elements, also metallic and other dusts adhering to the wire rope. The greatest factors contributing to short life in wire rope are corrosion, abrasion and frictional wear. Resistance to these factors can only be accomplished by lubrication of the rope in the manufacturing process and operational or maintenance service.

Correct lubrication of wire rope should be with a lubricant having the following essential characteristics: Adhesiveness to metal; high film strength; water repellence; corrosion prevention; compounded stability; heat resistance; resistance to salt water and acids; flexibility at low temperatures; imperviousness to other lubricants; solvency for removal in cleaning; simplicity in application; protection of the hemp core without deteriorating effects; and sealing of the rope to prevent infiltration of foreign substances to the strands and core.

Manufacturers of wire rope have developed a wide range in sizes and types together with a variety of grades for all service requirements. Materials used are the best obtainable, and the process of wire drawing and rope forming have been, and are continually being improved to furnish a satisfactory product or the best quality possible.

### Provide Initial Protection

In forming the rope, lubricants are used to provide initial protection against friction in service and corrosion in shipment and storage. Ordinary lubricants which have been used have been helpful but have left much to be desired in efficient operation. Some lubricants are advantageous in low cost, ease of application and possess some degree of lubrication, but lack the resistance of abrasion, moisture, acids, extreme pressure, heat and other factors. Invariably the lubricants are wiped off in handling, washed off by water, drip off from heat or volatilize.

Recent development by the Brooks Oil Co., Pittsburgh, of a product, known as Klingfast I.P. has exceptional characteristics as an indestructible in wire rope manufacturing, and offers the manufacturer or user a positive guarantee for the desirable protection. This product is a leaded petroleum compound, without fillers; is negative in corrosion factors, hardening in type but retaining affinity to metals and flexible covering to temperatures as low as minus 40° F. It is not affected by heat within the range of melting points which are high for this type of petroleum product. The covering is thin in nature, extremely adhesive and hardens to a flexible coating but is not sticky. This latter feature offers an unusual resistance to metallics and other abrasive substances that adhere to most lubricants.

This leaded petroleum compound is made in three grades or viscosities, and in two types. One type is for application with heat, the other with a solvent to eliminate the necessity of heat. Essential characteristics of this lubricant are:

(1) Indestructible pH-ilm strength of 50,000 pounds per square inch minimum by Timken testing machine, or 83 pounds on the lever arm. This is 2½ times the qualification necessary for extreme pressure lubricants.

(2) Adhesiveness in which affinity for steel and other metals develops maximum adhesion for this type lubricant, and prevents drippage or creeping. It retains a flexible coating in nature, despite extreme distortions in applications.

(3) High degree of water repellence. Retards washing off, creates a lubricating film under moisture or water conditions.

(4) Affords an excellent protective coating in that it will not etch or corrode metals. Lubricant is never acidic.

(5) Stability of physical characteristics. It will not bleed or change physical condition within range of higher than usual temperatures for this type of lubricant.

(6) Excellent low temperature factors. While having a solidifying action by decreased temperature as low as —40° F, it does not harden, crack or decrease in adhesion. The flexible coating withstands distortion of the application.

(7) Abrasive resistance is extremely high for lubricant. Does not wipe off nor will be removed in handling by workmen's hands or gloves. Is extremely repellent to adhesion of scale, metallics and other forms of dusts or contamination.

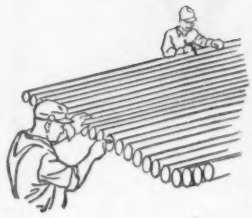
(8) Has remarkable corrosive resistance to salt or sea water, acidic vapors and solutions.

(9) Can be removed by ordinary solvents but is highly impervious to lubricating oils and greases.

This protective compound with its indestructible coating and other essential characteristics, outlined above, is available to meet the critical requirements for any rope service. This refers to the choice in heating, solvent, plastic or fluid type for application depending on conditions and opinions.

Experience has developed definite

# Steel tubes for Iron Horses



Today's high-efficiency locomotives demand a variety of steel tubes in their construction — stainless steel tubing, mechanical tubing, pressure tubes.

The locomotive of "The Cincinnatian", one of the crack trains of the B&O, is representative of today's finest streamlined "iron horses". Stainless steel tubes — used for trim and hand rails — are selected, not for beauty alone, but because they are impervious to stain or to corrosive attack by smoke, acids or weather.

Globe Steel Tubes Co., specializing in tubing manufacture, maintains continuous laboratory research to make steel tubes better — to produce tubes of such amazing uniformity and quality that they represent true "craftsmanship" in steel. If your needs in steel tubes involve problems — call upon the specialized experience and facilities of Globe.
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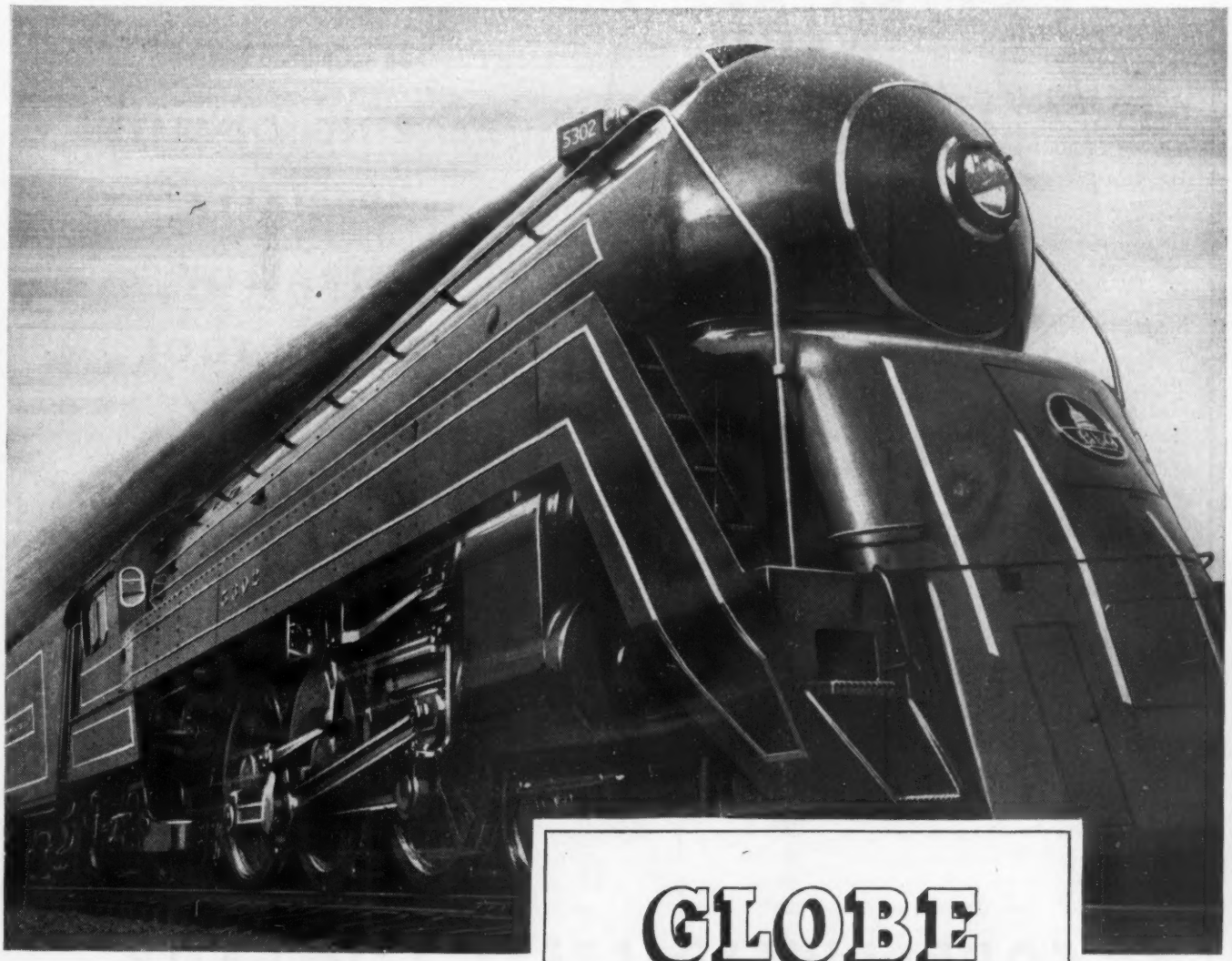
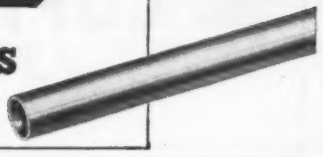
Photo — courtesy of the Baltimore & Ohio Railroad.




**GLOBE**

**STEEL TUBES**



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ARISTOLOY STEELS

## COPPERWELD STEEL COMPANY

WARREN, OHIO

proof of rope life having been more than doubled with application of this lubricant. Blast furnace skip hoists, in many instances, have operated with the same ropes for the full campaign of 4 to 5 years. Coal mine and other hoists, dredges, excavating equipment, drags, transmission equipment, submerged service and many other severe conditions have also produced substantiating data in accomplishments of Leadolene lubricants for wire rope applications.

In oil and gas field drilling operations, wire rope prepared with this lubricant has not been affected by oil, gas, water, salt water, sulphurous vapors and other troublesome conditions frequently encountered. Other lubricants which have been used have lost adhesiveness to the rope, flowed down to the bits and interfered with the operation to such an extent that removal and cleaning was necessary. This condition does not occur with application of this product, thus developing economies and reduced time in drilling. No evidence of corrosion has been developed in such service.

In salt water conditions wire rope lubricated in this manner has produced extraordinary service. The corrosion preventive feature is of such value that it may be conservatively estimated for substitution in many services where higher priced galvanized rope is commonly used.

Initial lubricating value of this product is said to be greater than other lubricants before additional lubricant is necessary, because of its inherent physical characteristics outlined above. Flexibility of the rope is increased and retained over a longer period with wear of rope reduced appreciably.

Lubricants of this type can be applied easily by pouring, spraying, brushing or swabbing and applications made less frequently than with other type lubricants.

—o—

Development of copper-base alloys from prehistoric days to the present and their importance in modern industry is the subject of a 16 mm, 33 min sound color motion picture, "Golden Horizons," issued by Ampco Metal Inc., Milwaukee. It is offered to technical societies and industrial plants without charge.

## River Project Motors Located Underground

An order for three large synchronous motors of unusual design for location 76 ft below ground level has been placed with General Electric Co., Schenectady, N. Y., by the Bureau of Reclamation. Intended for the Granby pumping station of the Colorado River Big Thompson project, each of the motors will have a rating of 6000 hp, 327 rpm and 6600 v and will drive vertical centrifugal water pumps.

Pumping station itself is 175 ft high, with all but 50 ft of this being below ground level. An oval shaped concrete structure, located more than 8000 ft above sea level, the unusual construction of the station requires motors of special design with enclosed cooling systems complete with air ducts and surface coolers. Enclosing all three motors will be a metal housing with electrically operated openings to allow heated air to be exhausted into the motor room for heating the building.

# MEASUREMENT TRENDS

### . . . *In a World of Fast Developments*

OLDEST function of measurement in society appears to have been the control of the quantity of commodities sold or exchanged, such methods having been developed centuries before the Christian era. Other functions, as brought out by Hugh L. Dryden, associate director of the National Bureau of Standards, Washington, before a recent meeting of the Instrument Society of America held in Cleveland, are as follows: Control of safe and efficient operation of mechanical and electrical machines and devices; serving as a research tool in the advancement of basic scientific knowledge; and extension of the human senses.

Things on which measurements are to be made, the number of properties to be measured and the complexity of the required measurements have increased tremendously in number lately, he stated. An example of a new property to be measured stems from application of atomic energy which will require knowledge of the neutron absorption of materials. Since this property may be controlling, materials showing desirable characteristics in this respect will have to have other properties measured, such as structural strength and rigidity at normal and high temperatures.

Complex equipment designed to save man physical and mental labor can be operated properly only when its performance and condition are known, requiring measuring devices which translate physical conditions to indications or records which are readily interpreted by the operator. Complexity has led to the development of remote indication so that the measurements of the performance of a whole power plant or even a whole electrical power network can be transferred to a single board where one individual can supervise the overall operation, he continued.

Having come this far, he stated that it is but a step to introduce automatic control of the operation of the plant, using pseudo-sensory reactions of the measuring instruments to command control mechanisms until the desired result is obtained to the satisfaction of the measuring instrument. Servomechanisms are at present in their infancy and development of such apparatus will place new and more stringent demands on the measuring elements.

Four trends have been noted by Mr. Dryden, the first being the development of robots of great physical power, equipped with a precise and interlocked nervous system capable of activities of the reflex nervous system of man, often of higher precision and capable of primitive forms of judgment. The second trend is the demand for increased accuracy of measurement in ordinary industrial applications of instruments.

Increasing application of electrical and electronic methods to problems of measurement is the third trend. Advantages of these methods are: Greater sensitivity and accuracy; possibility of remote indication; extreme flexibility; adaptation to transfer and amplification of power; and other types of energy supplied by the detector of a physical magnitude are readily transformed to electric energy.

Electronic instrumentation advanced rapidly during the war but peace time applications are just beginning to have their possibilities recognized, he asserted.

Final trend noted in the development of the art of measurement is the growing influence of the cross-fertilization of ideas among various fields. He stated that scientific and technical journals devoted solely to instruments, formation of professional divisions of the older technical societies, and growth of the Instrument Society of America are factors in this beneficial practice.

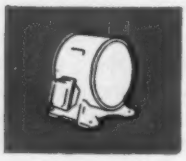
# The most important advance in motor design in 58 YEARS...

**★STANDARD INTEGRAL MOTORS, FRAMES 326 TO 203, NOW AVAILABLE FROM STOCK**

Features and improvements demanded most by users ALL WRAPPED IN A SINGLE PACKAGE

When Westinghouse engineers began designing a postwar motor they abandoned the concept that all motors must be cousins. Instead, they asked electric motor users *what they wanted* in motors . . . features they couldn't buy in any one motor.

These features demanded most by motor users are *all* incorporated in the new Life-Line Motors:



**ALL-STEEL PROTECTION.** All frames, feet and brackets are HEAVY STEEL. Life-Line Motor stators are far stronger—a new core locking device eliminates rivets.

Westinghouse

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# the New WESTINGHOUSE Life-Line MOTOR

It's completely new . . . it's completely different . . . it wraps up the advances made in "custom-built" wartime motors in a single package!

For 58 years, induction motors have been built fundamentally alike. Differences have been minor . . . improvements gradual. Today, in the new Life-Line, Westinghouse presents a major departure from accepted ideas of standard-motor limitations.

Life-Line, today, offers industry a truly all-steel protected motor. All exposed surfaces are HEAVY STEEL—frames of even the smallest sizes are 3/8" thick.

More compact power is packed in Life-Line. For example, on the 284 frame, size has been reduced 35%, although NEMA mounting dimensions have been maintained . . . starting torques are as much as 134% greater per pound of motor . . . maximum torques as much as 116% more per pound.

Electrical characteristics have been improved . . . new materials and new winding techniques give increased protection against electrical failure. And sealed, pre-lubricated bearings do away with need for greasing or attention for at least five years!

The Life-Line Motor, as a result, represents the biggest single step forward in design and construction since the invention of the electric motor 58 years ago. Life-Line Motors are now reaching the drives of industry by the thousands, but are not yet available in quantities to meet the unprecedented demand. So, look over Life-Line advantages now with an eye to your future requirements. Your local Westinghouse office can give you full details, or write to Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, N. Y.

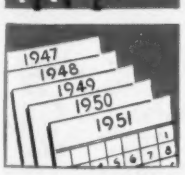
★ ★ ★

*Life-Line Motors are now in production at the new Westinghouse Motor Works in Buffalo, N. Y. This plant is laid out, tooled and equipped to fully utilize newly developed production processes and techniques on a scale hitherto unequalled in the manufacture of electrical motors.*

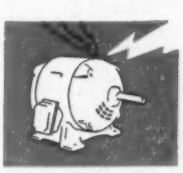
J-21406

**LESS SPACE PER HP.** Life-Line Motors occupy less space per horsepower than any other standard motor . . . making it easier to build into machines and install in cramped quarters.

**MORE TORQUE PER LB.** Life-Line Motors give as much as 134% higher starting torque per pound of motor . . . up to 116% higher maximum torque.




**NO LUBRICATION FOR 5 YEARS.** Life-Line Motors need no greasing for AT LEAST FIVE YEARS. Bearings are pre-lubricated . . . sealed against dirt and moisture.



**IMPROVED WINDINGS.** New insulating materials . . . new coil winding techniques . . . new stator slot designs . . . give the Life-Line new record-setting protection against electrical failures.

**NEW QUIET SMOOTHNESS.** Life-Line Motors cut vibration and noise to new low limits for standard motors . . . satisfy many "special motor" requirements.

**NEW SLEEK LINES.** The Life-Line has sleek lines . . . a smooth finish . . . discourages dust and dirt accumulations . . . harmonizes with modern machine and tool design.

# Life-Line motors

# FACTORS AFFECTING
# Basic Open-Hearth Operating Rates

By RICHARD H. EDE
*Metallurgist, Gary Steel Works*
Carnegie-Illinois Steel Corp.
Gary, Ind.

*Evaluation of three measures affords means of observing effect of feed ore on melt and tap carbons. Multiple correlation methods lend themselves to an accurate analysis of any problem involving various numerical factors. Application of method to open-hearth shop problem described by author*

RECENTLY the field of statistics provided a number of valuable tools by means of which answers to some specific problem may be found. Multiple correlation is one of these tools, but an important one where the solution depends on the correct appraisal of a considerable number of factors. An actual problem in steelmaking in which multiple correlation is used to find the answer follows. Three measures which will be used in this application are the coefficient of correlation, the beta coefficient, and the coefficient of determination.

The coefficient of correlation (r) is a measure of the apparent degree of relationship between two factors which is completely independent of the units of the original data. In two factors each of which varies through a working range, the coefficient of correlation is a measure of how much of this variation is common to both factors. In a series of such relationships this measure offers a means of comparing the relative effects of a number of factors.

If all of a series of factors were related only to a criterion and not related in any manner to each other, the correlation coefficient could be used to present the final results of a problem. In actual practice many factors are highly related to each other and, to be able to judge results in their true perspective, effects of interrelationships or variations common to the factors themselves should be removed. In multiple correlation this is accomplished by holding all other factors constant at their average levels while the effect of the one factor in question is studied. The relative effect of each

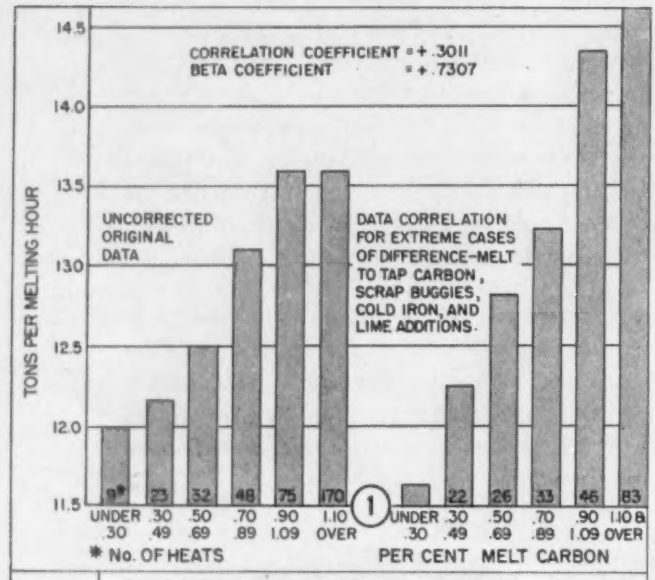

CORRELATION COEFFICIENT = +.3011
BETA COEFFICIENT = +.7307
UNCORRECTED ORIGINAL DATA
DATA CORRELATION FOR EXTREME CASES OF DIFFERENCE-MELT TO TAP CARBON, SCRAP BUGGIES, COLD IRON, AND LIME ADDITIONS.
TONS PER MELTING HOUR
14.5
14.0
13.5
13.0
12.5
12.0
11.5
9* 23 32 48 75 170 1 22 26 33 46 83
UNDER .30 .50 .70 .90 1.10 OVER
.30 .49 .69 .89 1.09
UNDER .30 .50 .70 .90 1.10 & OVER
.30 .49 .69 .89 1.09
* No. OF HEATS
PER CENT MELT CARBON

*Fig. 1—Tons per melting hour versus per cent melt carbon*

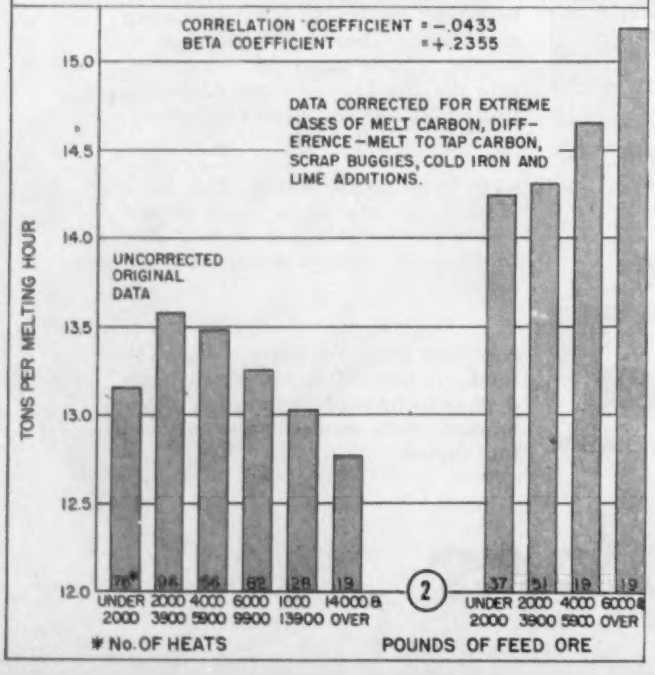

CORRELATION COEFFICIENT = -.0433
BETA COEFFICIENT = +.2355
DATA CORRECTED FOR EXTREME CASES OF MELT CARBON, DIFFERENCE-MELT TO TAP CARBON, SCRAP BUGGIES, COLD IRON AND LIME ADDITIONS.
UNCORRECTED ORIGINAL DATA
TONS PER MELTING HOUR
15.0
14.5
14.0
13.5
13.0
12.5
12.0
78* 96 86 62 28 19 2 37 51 19 19
UNDER 2000 4000 6000 10000 14000 & OVER
2000 3900 5900 9900 13900
UNDER 2000 4000 6000 & OVER
2000 3900 5900
* No. OF HEATS
POUNDS OF FEED ORE

*Fig. 2—Tons per melting hour versus feed ore additions*

**TABLE I**
**COEFFICIENTS OF CORRELATION FOR CHARGING FACTORS**

| | Tons Per Melting Hour | No. Buggies of Scrap | % Scrap Charge | % Ore Charge | % Cold Iron Charge |
|---|---|---|---|---|---|
| No. Buggies of Scrap .... | −.1842 | | | | |
| Scrap charge, % ..... | +.0501 | −.0210 | | | |
| Ore charge, % ..... | +.1578 | 0 | −.1443 | | |
| Cold iron charge, % .... | −.2480 | +.1362 | −.1737 | −.1914 | |
| Hot metal charge, % .... | +.2326 | 0 | −.1200 | +.2580 | −.9385 |

**TABLE II**
**COEFFICIENTS OF CORRELATION FOR WORKING FACTORS**

| | Melting Hour | Carbon | Diff. Melt to Tap C | Lime Additions | Ore Additions |
|---|---|---|---|---|---|
| Melt carbon ..... | +.3011 | | | | |
| Difference-Melt-Tap C .. | −.2271 | +.5731 | | | |
| Lime additions ..... | −.2589 | +.2761 | +.2444 | | |
| Feed ore ..... | −.0433 | +.3685 | +.7114 | +.1185 | |
| Furnace age ..... | −.1107 | +.0435 | −.0406 | −.0252 | −.1185 |

**TABLE III**
**CARBON DIFFERENTIATION**

| Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| Melt Carbon ..... | +.3011 | +.3011 | +.0907 | 9.1 |
| **Difference Between Melt Carbon and Tap Carbon** | | | | |
| Melt Carbon ..... | +.3011 | +.6422 | +.1934 | 19.3 |
| Difference-Melt ... | −.2271 | +.5951 | +.1351 | 13.5 |
| Per cent variation in tons per melting hour explained by both factors (Coefficient of determination) ..... | | | +.3285 | 32.8 |

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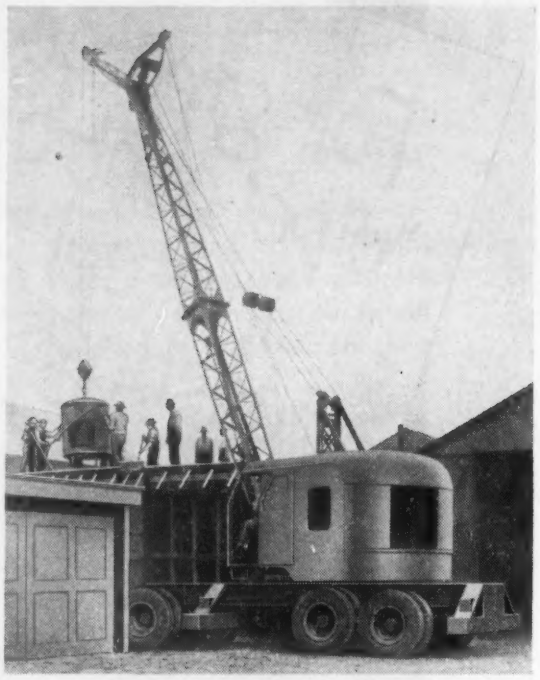

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factor from which effects of these interrelationships have been removed is measured by its beta coefficient ($\beta$). In a study of the effects of a series of factors on a criterion, the beta coefficients measure the relative independent effects of each factor on the criterion.

By means of a convenient statistical measure it is possible to obtain the proportion of a problem explained by a set of factors. This measure, known as the coefficient of determination ($R^7$), is obtained mathematically by multiplying the coefficient of correlation for each factor by its corresponding beta coefficient and then adding the result. Thus, it may be seen that the coefficient of determination, in addition to measuring the total effect of a set of factors, also measures the individual contributing effect of each factor.

One approach to an analysis by multiple correlation is to add one factor at a time to the matrix. As each factor is added, successive changes are noted in the independent effects (beta coefficients), contributing effects and total effect (coefficient of determination) of all factors added to that point. These changes explain many of the effects that might otherwise be lost in performing the multiple correlation all in one operation. How this approach may be used in the analysis of a problem in basic steelmaking operating rate is described in the following application.

Data were collected and tabulated on 357 heats made with a low scrap charge in No. 4 open-hearth shop at Gary Steel Works during January, 1947. No. 4 shop consists of 14 basic open-hearth furnaces of 145 tons rated capacity. Thirteen of the 14 furnaces were in operation daily, one furnace being down for repairs at all times. All heats were oil fired using an average mixture of 85.5 per cent fuel oil and 14.5 per cent coke oven gas based on oil equivalents.

Type of product varied from rimmed steel with 0.05 per cent carbon to spring steel with 1.00 per cent carbon. Approximately one third of the heats were made to rail and wheel specifications with an average percentage of 0.75 carbon; one-quarter were made to specifications of 0.10 carbon and under; and the remainder, including a number of high sulphur heats, were distributed among other ranges of carbons.

Criterion selected to measure operating rates was "tons per melting hour" which was obtained for each heat by dividing the tons produced by the time of the heat from start charge to tap. In this manner delays between heats which might mask effects of other factors were eliminated.

First step in the analysis is that of obtaining coefficients of correlation relat-

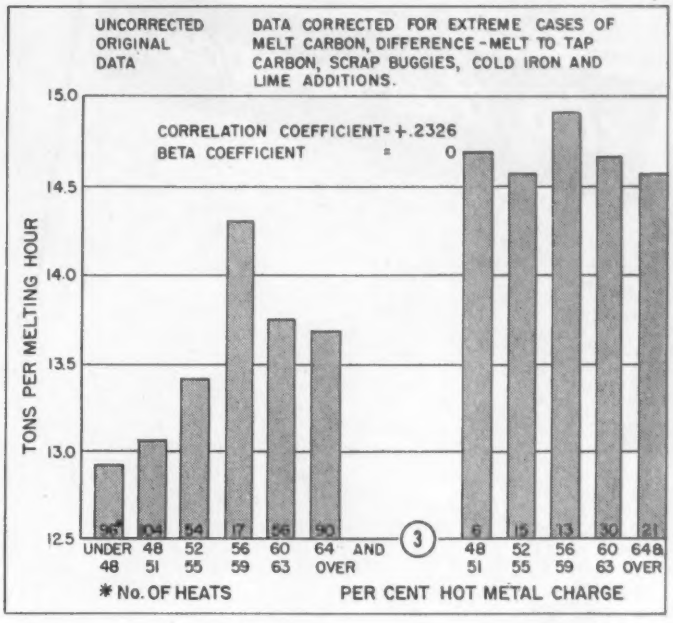


*Fig. 3—Tons per melting hour versus per cent hot metal charge*

**TABLE IV**
**EFFECT OF LIME ADDITIONS**

| Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| Melt Carbon | +.3011 | +.7032 | +.2117 | 21.1 |
| Difference-Melt to Tap C. | —.2271 | —.5546 | +.1260 | 12.6 |
| Lime Additions | —.2589 | —.3155 | +.0817 | 8.2 |
| Per cent variation in tons per melting hour explained by 3 factors (Coefficient of Determination) | | | +.4194 | 41.9 |

**TABLE V**
**EFFECT OF FEED ORE ADDITIONS**

| Feed Ore Additions: Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| Melt Carbon | +.3011 | +.7147 | +.2152 | 21.5 |
| Difference-Melt To Tap C | —.2271 | —.7500 | +.1703 | 17.0 |
| Lime Additions | —.2589 | —.3019 | +.0782 | 7.8 |
| Feed Ore | —.0433 | +.2627 | —.0114 | —1.1 |
| Per cent variation in tons per melting hour explained by 4 factors (Coefficient of Determination) | | | +.4523 | 45.2 |

**TABLE VI**
**EFFECT OF FURNACE AGE**

| Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| Melt Carbon | +.3011 | +.7307 | +.2200 | 22.0 |
| Difference-Melt to Tap C | —.2271 | —.7459 | +.1694 | 16.9 |
| Lime Additions | —.2589 | —.3081 | +.0798 | 8.0 |
| Feed Ore | —.0433 | +.2355 | —.0102 | —1.0 |
| Furnace Age | —.1107 | —.1528 | +.0169 | 1.7 |
| Per cent variation in tons per melting hour explained by 5 factors (Coefficient of Determination) | | | +.4759 | 47.6 |

**TABLE VII**
**EFFECT OF VARIOUS CHARGES**

| Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| No. scrap buggies | —.1842 | —.1567 | +.0289 | 2.9 |
| Scrap charge, % | +.0501 | +.0304 | +.0015 | 0.1 |
| Ore charge | +.1578 | +.1244 | +.0196 | 2.0 |
| Cold iron charge, % | —.2480 | —.1976 | +.0490 | 4.9 |
| | | | +.0990 | 9.9 |

**TABLE VIII**
**INTERRELATIONSHIP BETWEEN COLD AND HOT METAL CHARGE**

| Factor | Apparent Effect (Correlation Coeff.) | Independent Effect (Beta Coefficient) | Contrib. Effect | % Contrib. Effect |
|---|---|---|---|---|
| Cold iron charge, % | —.2480 | —.2480 | +.0615 | 6.1 |
| Hot metal charge, % | +.2326 | 0 | 0 | 0 |

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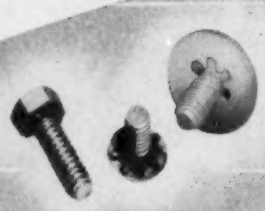

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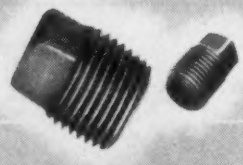

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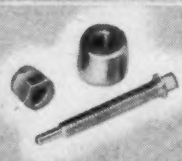

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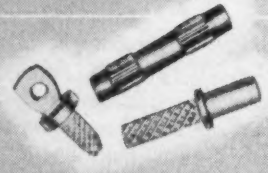

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ing each factor to "tons per melting hour" and each factor to all other factors. With 357 heats these coefficients are most economically obtained by the use of correlation tables. Correlation tables have the additional advantage of indicating the type of relationship by the manner in which the frequencies are distributed throughout the cells. Relationships which vary too far linearity must be handled by nonlinear correlation methods. None of the relationships discussed in this problem varied far enough from linearity to justify the extra labor involved in using nonlinear methods.

Coefficients of correlation are presented in two separate matrices, one containing charging factors and the other containing working factors. This can be done because interrelationships between the two groups are too low to make any essential difference in results and working with two sections somewhat simplifies the solution of the problem. Two matrices are shown in Tables I and II.

Each coefficient listed in the column headed "tons per melting hour" is a measure of the apparent degree of relationship of tons per melting hour with the factor opposite which it is listed. The size of the coefficient indicates the degree of association and the sign in front of the coefficient indicates whether it is positively or negatively associated. High values of all factors with plus signs are associated with faster operating rates and high values of those with minus signs are associated with slower operating rates.

Examination of the coefficients listed under other headings indicates that a number of factors are highly intercorrelated. This is especially true of the items listed in the section under the general heading of "working factors." It is evident that these interrelationships must be taken into consideration before a true picture of the effect of each factor can be established.

Proceeding as previously outlined, these factors will be added one at a time and successive changes in their independent and contributing effects noted. Since the working factors offer a greater variety in points of illustration they will be considered first.

**Melt Carbon:** Selecting melt carbon as a starting point it will be noted that its coefficient of correlation is +.3011. With only one factor to consider, there can be no intercorrelation and its beta coefficient, therefore, will be the same as its correlation coefficient. The picture at the start is shown in Table III.

With the addition of difference between melt carbon and tap carbon the percentage of explained variation in tons per melting hour has jumped from 9.1 to 32.8 per cent. The independent effect of melt carbon has increased from +.3011 to +.6422 and that of the difference between melt carbon and tap carbon has increased from −.2271 to −.5951. Most of this increase is due to the removal of the effect of the high intercorrelation between the two factors (+.5731). Without correcting for this interrelationship the extreme importance of the influence of these two factors on operating rates might be unnoticed.

The picture immediately furnishes clues as to what might be done to increase operating rates. Controlled melts to avoid low melt carbons and flexible scheduling to match carbon workdowns with melt carbons to avoid large differences between melt carbons and tap carbon should prove economically worthwhile.

**Lime Additions:** With the lime additions the percentage of explained variation has increased from 32.8 to 41.9, as shown in Table IV. The factor itself is responsible for 8.2 per cent of this increase while removing the effects of intercorrelations has increased the contributing effect of melt carbon from 19.3 to 21.1 per cent and decreased the contributing effect of difference between melt carbon and tap carbon from 13.5 to 12.6 per cent. It becomes obvious, then, that large lime additions should be avoided wherever possible.

Strange things have happened to the picture with the addition of feed ore. What appeared to be a slight negative association with tons per melting hour (−.0433) has turned out to be positive in its independent effect (+.2627) indicating that, independently, feed ore is of considerable importance as a factor in speeding up operating rates. Why this was not shown by the correlation coefficient becomes clear upon examination of the matrix. The high intercorrelation of +.7114 between feed ore and difference between melt carbon and tap carbon had completely masked its true effect. In actual practice large amounts of feed ore are used to speed up heats which are under a handicap of having a long distance to go from melt carbon to tap carbon. When the speedup effect of feed ore is removed, the additional slowdown effect of the difference between melt carbon and tap carbon becomes evident. In this picture the addition of feed ore has increased the contributing effect of the difference between melt carbon and tap carbon from 12.6 to 17.0 per cent and increased its independent effect from −.5546 to −.7500. (Table V).

**Furnace Age:** The life of an open-hearth furnace is limited and from time to time each furnace must be shut down for general repairs. The time between one shut down and the next is referred to as a campaign and the number of heats since the last shut down is generally termed furnace age. Toward the end of a campaign a furnace efficiency is in-

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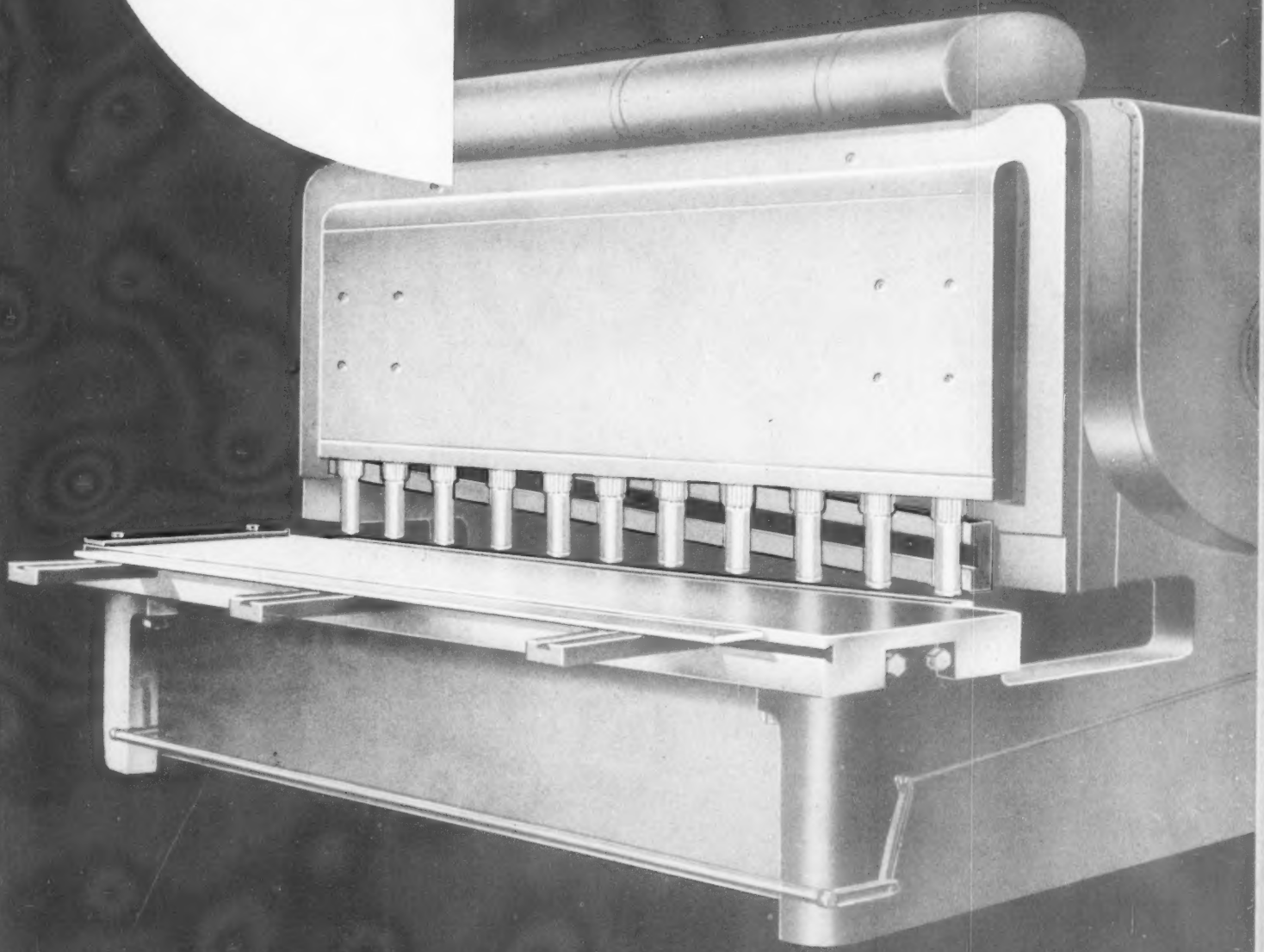

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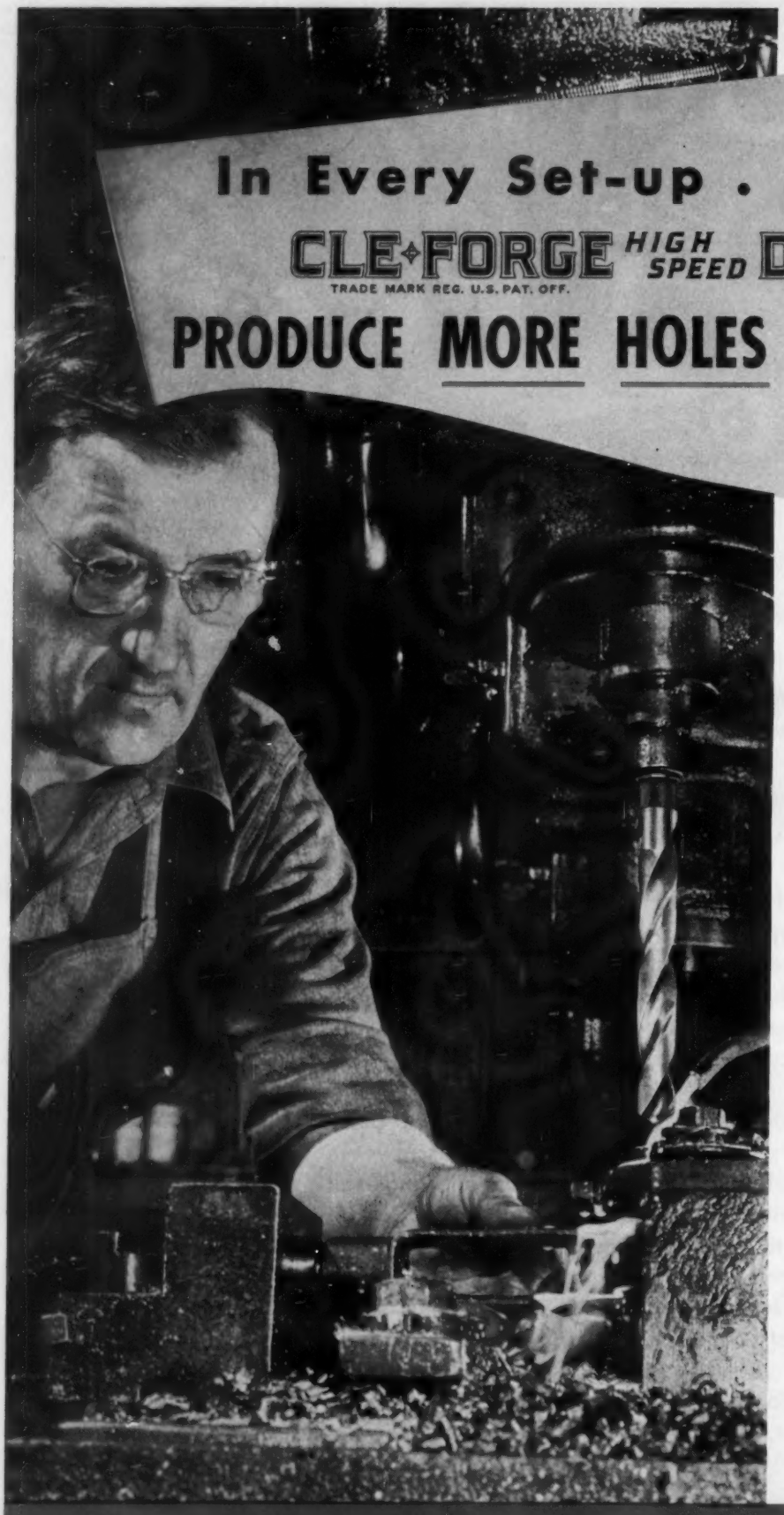

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clined to be lower and for this reason furnace age becomes a factor in slowing down operating rates. How much this factor enters the picture is shown in Table VI.

Addition of furnace age has increased the total explained variation in tons per melting hour from 45.2 to 47.6 per cent. Of this increase furnace age alone is responsible for 1.7 per cent and the balance appears in slight increases in contributing influences of melt carbon and lime additions. This might suggest that furnaces in the latter stages of a campaign are particularly vulnerable to low melt carbons and large lime additions.

Because no additional points of illustration occur in this set of factors up to the point of per cent hot metal change, the first four factors are presented as a group in Table VII.

No great change has occured upon removing effects of intercorrelations, except for a general lowering of the independent effect of each factor on tons per melting hour. When per cent hot metal charge is added to this group of factors, however, the result becomes a statistical impossibility. An examination of the matrix reveals a possible cause in the extremely high correlation between per cent cold iron charge and per cent hot metal charge (−.9385).

Reason for this may be found in a review of the original data in which it is apparent that of the total metallic charge, scrap charges are constant, while hot metal charges are increased or decreased respectively as cold iron charges are decreased or increased. This negative relationship between the two factors is so great as to approach a functionality. Since this is the case, the next logical step would be to remove this high interrelationship between per cent cold iron charge and per cent hot metal charge and see what happens. See Table VIII.

After performing this operation the effect of cold iron charge remains the same while that of hot metal has completely disappeared. Statistically this tells us that, of these two factors, cold iron exerts all of the effect on tons per melting hour. Its negative coefficient would indicate that percentages of cold iron charges should be lowered to produce faster operating rates or at least the size of the pieces of material charged should be kept small enough to melt rapidly.

Independent and contributing effects of the other charging factors suggest that favorable results should be obtained by avoiding scrap charges dispersed throughout a large number of buggies, and increasing ore charges whenever operating conditions permit.

Altogether, then, 9.9 per cent of the variations in tons per melting hour have been explained by variations in charging factors and 47.6 per cent have been explained by working factors. This means that all ten factors have accounted for 57.5 per cent of the variation in tons per melting hour. What about the remaining 42.5 per cent?

Obviously most of this remainder is probably due to factors not included in this analysis. When this study was made at Gary Steel Works, it was found that variations in total metallics charged and tonnage produced accounted for an additional 10.8 per cent towards the explained variation in tons per melting hour. Lime charges contributed nothing possibly because the amount charged was practically standard throughout the 357 heats.

Physical and chemical characteristics of hot metal are known to have effects on operating rates, but were not included in this study because it was impossible to identify any particular lot of hot metal as having been used in any one furnace. Variations in types and mixtures of fuels are known to have an effect on operating rates, but these data were not available on a heat to heat basis. Atmospheric conditions have also been observed to have some effect on operating rates.

It is certain that if these factors were effective their inclusion would increase the percentage of explained variation in tons per melting hour. Whether or not their inclusion would effect contributing influences of the factors already listed in this analysis would depend on any intercorrelations which they might have with these factortors.

In presenting results of an analysis of this kind it is difficult to select any one measure which will properly evaluate effects of each factor. Perhaps percentage of contributing effect would give the best summary of such results. Even with this measure some important relationships might escape attention without consideration of apparent and independent effects. A good example of this is feed ore in which it appears that its contributing effect is less than nothing. Only by considering all three measures in a step by step procedure is it possible to observe how the effects of feed ore are reflected in an increase in the contributing effect of the difference between melt carbon and tap carbon.

In addition to evaluating the effects of a set of factors by the method just described it is customary to present curves of the independent effects of each factor. This may be done statistically by using their beta coefficients in appropriate equations. Perhaps a more convincing method to those not familiar with statistical procedures would be to present curves in class intervals of the original data from which all extreme cases of factors found to have an important effect are eliminated. This method in effect partially corrects for intercorrelations and still retains any nonlinear characteristics which might exist in the relationships. Samples of such curves are shown in Figs. 1 to 3 along with curves of the original uncorrected data.

Multiple correlation methods, if properly handled, should be capable of producing an accurate analysis of any problem consisting of a number of numerical factors. It is believed that a step by step approach to the subject offers a means of obtaining a clearer picture of the relationships of the factors involved.

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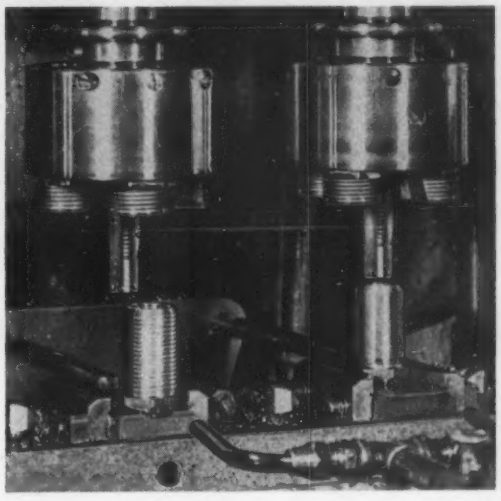
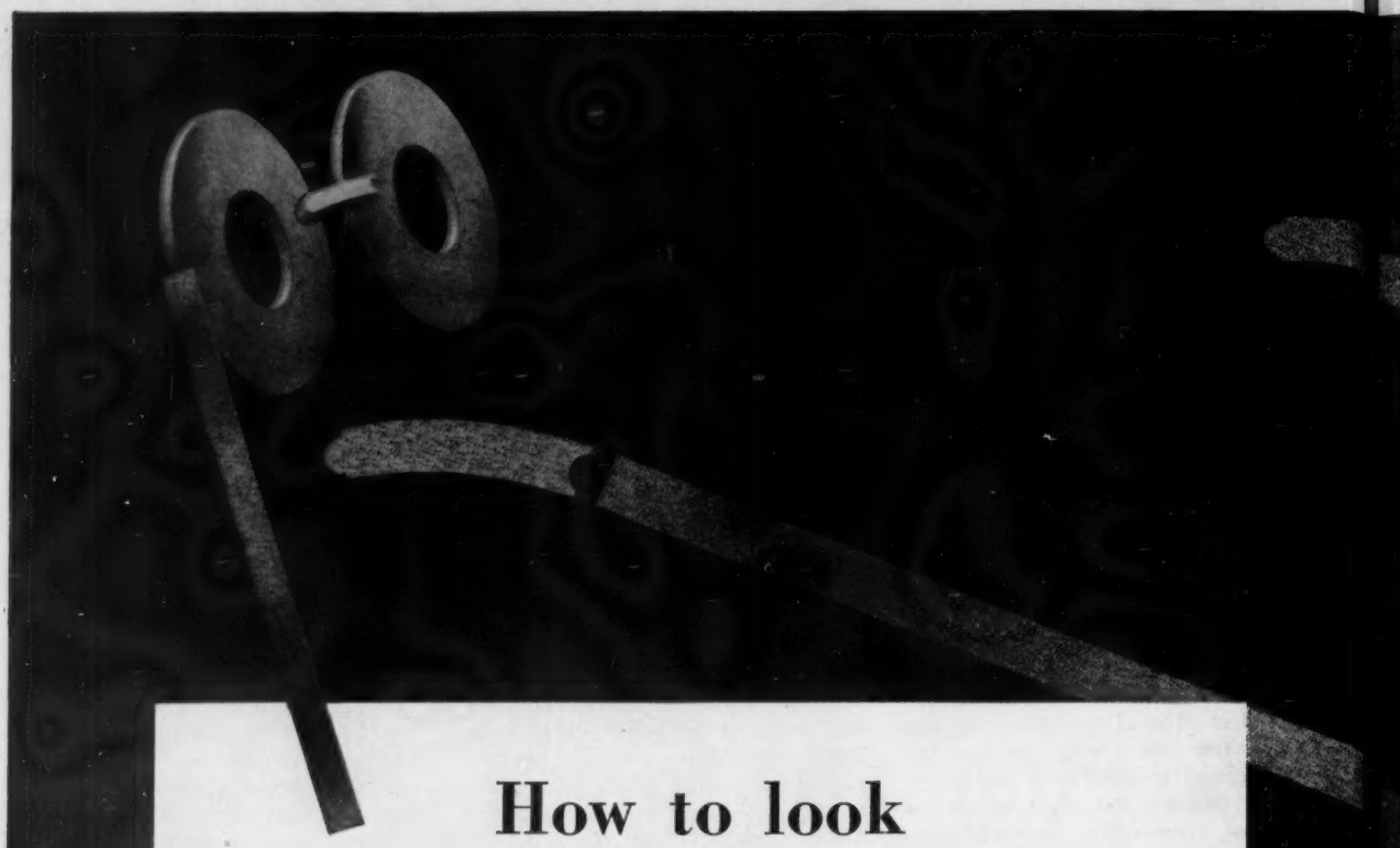
From a paper presented at Purdue University, Lafayette, Ind., July 3, as part of a special course in advanced statistics.

**THREADING STEEL BUSHINGS:** Simultaneous internal and external threading of large steel bushings increased productivity to 1100 threaded parts per hour in the Saginaw Steering Gear Division plant of General Motors Corp., Saginaw, Mich. Shown are two bushings of cold rolled SAE 1111 steel, one before and one after threading with taps made by Detroit Tap & Tool Co., Detroit, on a 10-spindle Allen multiple drill press. Internal thread is machined with a tap having a pilot to assure correct alignment, while external threads are cut with chasers revolving with spindle





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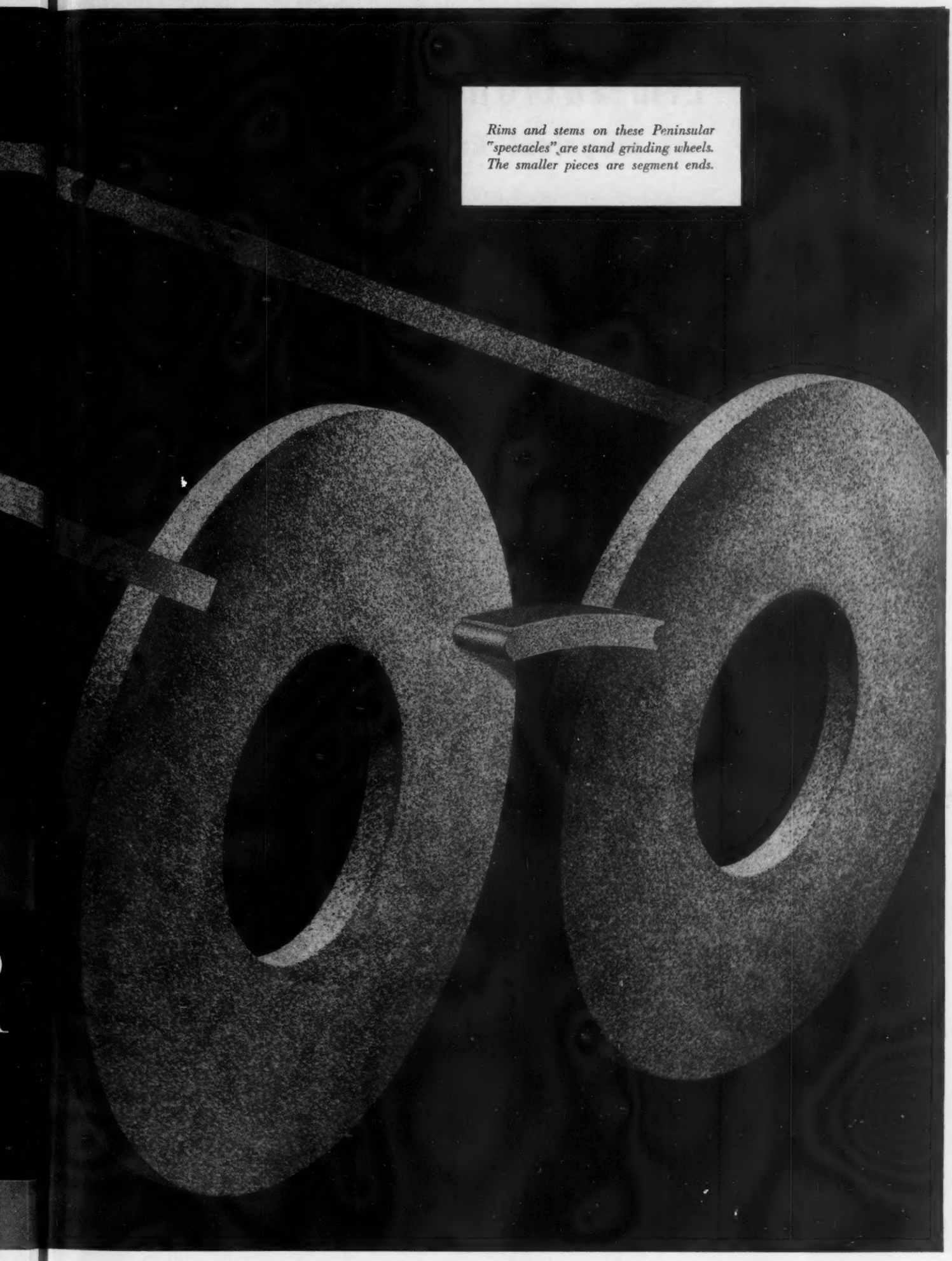

*Rims and stems on these Peninsular "spectacles" are stand grinding wheels. The smaller pieces are segment ends.*

# Worker Limitations

## of Physical Exertion

### . . . in high heat and humidity determined in experiments

EXPERIMENTS performed under conditions of environmental heat severe enough to make a man's skin temperature remain above 95° F show that men can maintain rates of sweating 600 to 800 g per hour for long periods of time, according to tests conducted by Department of Physiology of Indiana University Medical School for the Quartermaster Corps. Sweating at a constant rate of 1200 to 1800 g per hour for 6 hours in a severely hot humid or hot dry environment cannot be maintained, there being considerable danger of heat stroke as the production of sweat would be insufficient to meet evaporative requirements.

Tests were conducted in a hot climate room with precise control of temperatures and humidity over a wide range of environmental conditions. Men who served as subjects were carefully weighed before test, at 1 hour intervals and at the completion of the tests. They were given enough water with 0.1 per cent salt solution to compensate for sweating so that no reactions could be due to dehydration of the body. The rates and amounts of sweating were determined to the fraction of a gram.

Under extremely high temperature and humid conditions, men working at the metabolic rate of 190 calories per square meter of skin per hour sweated profusely during the first hours of the tests. Sweating progressively decreased as the work continued and the body temperatures rose to the danger point beyond which heat prostration was likely to occur.

Men clad in lesser amounts of clothing were able to maintain thermal equilibrium at considerably higher temperatures and humidity than men dressed in light clothing doing the same amount of work. Those dressed in light clothing attained thermal equilibrium from the second through the fourth hours but they experienced a pronounced decrease of sweating and a secondary rise in temperature by the end of the sixth hour. Reducing the work so that the metabolic rate was 128 calories per square meter of skin per hour made it possible for the clothed men to continue in equilibrium through the sixth hour.

In 50 experiments, the average sweating rate during the first 2 hours was 1400 g per hour. The rate declined from 10 to 80 per cent of this value by the sixth hour, depending upon environmental conditions. Further experiments showed that while men were working in heat there was an average increase of 13 per cent in their blood volume over the value determined on them in a cool environment. Increase in blood volume involved a 19 per cent increase in total circulating red cells, 9 per cent increase in plasma volume and 20 per cent increase in the total circulating plasma protein.

While working in heat, plasma volumes of the men were decreased by dehydration 16 per cent more than expected if the plasma had lost water in proportion to the water loss by the entire body.

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## Silver Alloy Brazing

(*Continued from Page* 77)

a 3/4-inch diameter, 10-inch copper tube using rings of a low temperature brazing alloy. Production is at the rate of 2000 units in an 8-hour day with two operators, compared to 1000 units requiring eight operators by the former method of hand brazing. Rejects were reduced better than 50 per cent.

This process, like all production brazing processes, is divided into five operations: Cleaning of parts; assembling; fluxing; brazing; and final cleaning and inspection. As cleanliness is essential to good brazing, the parts should be thoroughly degreased and all oxides and dirt removed. This is immediately followed by fluxing of the joint surfaces and then assembling.

Assembling consists of placing a ring of brazing alloy of 3/4-inch inside diameter 3/64-inch wire around the copper tube and inserting it into the machined brass flange with the ring resting on the flange. The copper plug is then placed into the upper end of the copper tube resting on a counterbore. A 3/4-inch outside diameter ring of 1/32-inch brazing alloy wire is placed on the plug. Brazing occurs when the assemblies are placed on the supports of the moving belt and are passed through the multiflame burners which are of the ribbon type, utilizing oxygen and propane. The parts are rotated while they move along through the burners thus facilitating uniform heating. Gradually the temperature rises to approximately 1200° F at which time the alloy flows by capillary attraction throughout the entire joint area. After passing out of the flame of the burners, the assemblies cool to about 800° F (this is important in all production brazing) and drop into a tank containing hot water. After a few minutes' immersion, which dissolves the excess flux, the coupler units are removed from the tank and are inspected for quality of braze, surface porosity, alignment and subsequently given a hydrostatic test to check for leaks.

Ring burners semicircular in shape may be used with various types of gases and oxygen. Burners of this type can be made in various shapes and can be designed to use gas and air. In such cases, oxygen can be bled into the line for more accurate control of the brazing temperature. Articles similar to the four-wheel cycle shown in Fig. 4 can be brazed very suitably with this type of burner.

Production brazing shown in Figs. 1 and 5 all involve a straight-line conveyor for moving the parts in the heating stations. In the case of the thermal couplers, the conveyor moves continuously, while in the refrigeration condenser coil operation the conveyor is cycled intermittently.

A rotating table is very often used for conveying parts during the brazing operation. Fig. 2 illustrates the oxyacetylene brazing of a fishing reel assembly utilizing a rotating table for handling the parts. The assembly consists of stainless stampings and screw machine parts together with a brass spud gear. Low temperature brazing alloy washers are used as shown. Washers generally are to be avoided if possible because more brazing alloy must be manufactured to obtain the required amount of material for brazing (a rectangle with the outside corners and inner disk becomes scrap) than if round wire rings or coined rings are used.

Two sets of flames are employed for brazing, one set being used for preheating the parts. The flames are arranged to heat the assembly uniformly with

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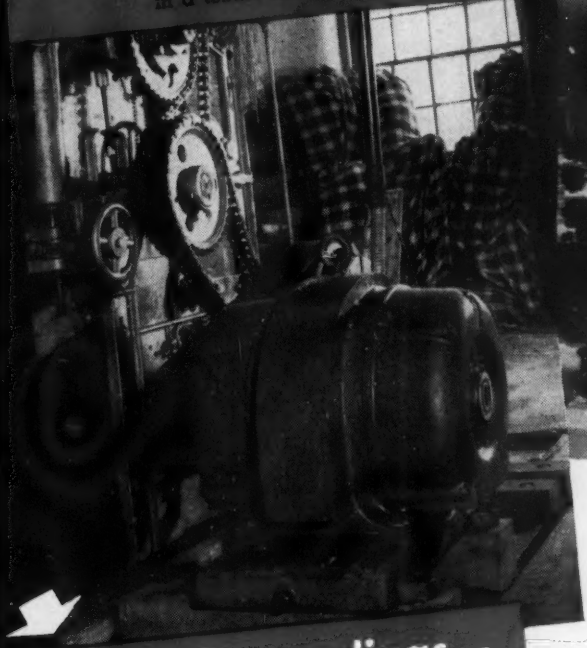
**Splashing Liquids—**
Century 50 horsepower Splash Proof motor in a textile mill.



**Explosive Gases—**
Century 20 horsepower Explosion Proof motor driving a gasoline loading pump.

**Clean Surroundings—**
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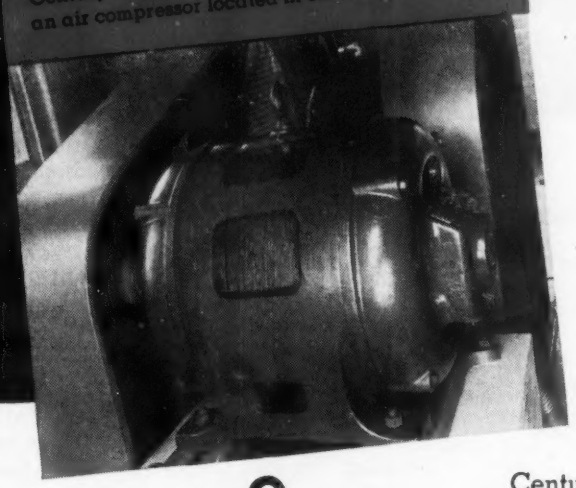

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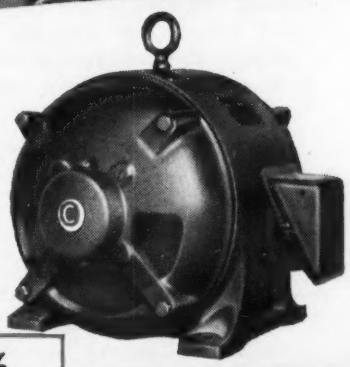

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careful attention given to avoid overheating the light stainless steel disks. A spring loaded fixture supports the parts during brazing. The table indexes automatically with a cam arrangement timed to give a high rate of production.

Sometimes it is necessary to braze parts that are very irregular and do not conveniently lend themselves for handling on a conveyor belt or rotating table. In such instances, the parts are firmly jigged and the burners, supported in movable fixtures, are guided into position mechanically or manually to uniformly heat the parts to brazing temperature. There are applications also where the burners or means of heating are stationary and the parts, properly supported, are guided into position for brazing as pictured in Fig. 3 which is a front support member of a four-wheel cycle. Note the clean, neat joints that are obtained. There are no fillets or excess brazing alloy to remove, making it possible to produce these high strength joints at a very low cost. The completed cycle shown in Fig. 4 contains 11 joints all silver alloy brazed at a very high rate of production.

It was stated earlier that the consumption of silver brazing alloys is increasing in those applications involving high production methods. There are many reasons why manufacturers are taking advantage of this method of joining. First, the free flowing, low-temperature alloys are ideally suited for continuous production. Second, by properly assembling and handling parts, it is possible to employ unskilled labor in the manufacture of items requiring skilled operators if produced by other methods. Third, accurate control of brazing alloy is possible because in most high speed production applications the alloy is preplaced in some predetermined size and shape. Finally, by taking full advantage of all of the possibilities offered by low temperature brazing, production can be accomplished at low cost. One manufacturer after another has learned that it is possible to join parts at a lower cost using the low temperature silver brazing process than by other methods of joining. In some cases, savings as high as 50 per cent have been realized.

---

From a presentation by A. M. Setapen, Manager, Engineering Division, Handy & Harman, New York, before 47th annual convention of International Acetylene Association, Cincinnati.

—o—

Applications to various assembly problems which have resulted in time and weight savings and have overcome the vibration-loosening problem are shown in the 17-minute, 16 mm motion picture, "Speed Nut Savings Factor," obtainable from Tinnerman Products Inc., Cleveland 13. It is offered free of charge to all interested industries.

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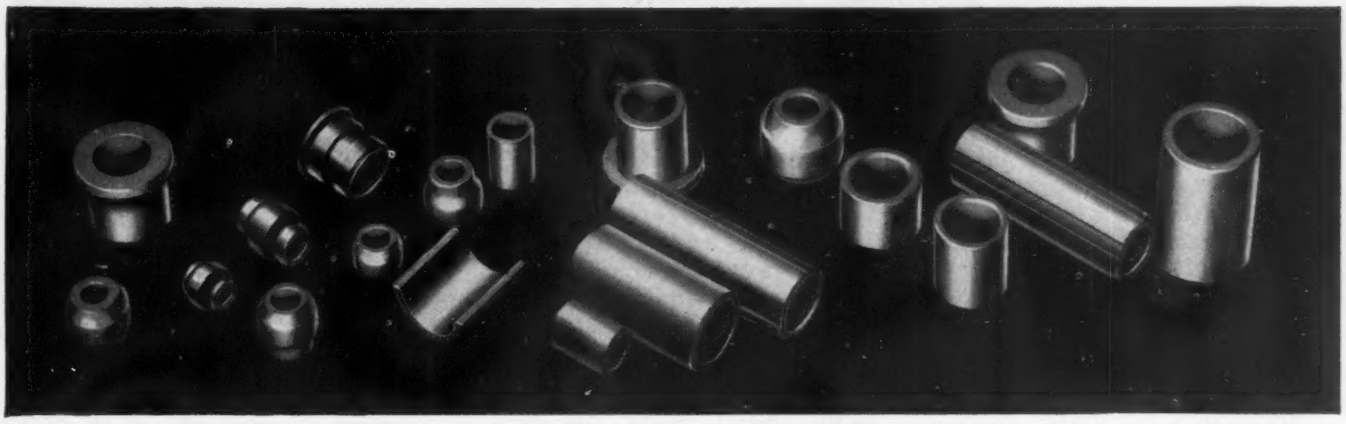

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## Conveying System

(*Continued from Page 74*)

line up with another free line which is pitched so that the carrier and frame now flow on trolleys into it and on to a point some feet beyond.

At that point, an overhead trolley conveyor traveling at a normal automobile assembly-line speed, engages the trolley now supporting the carrier and frame by means of pusher dogs, moving it from this point on to the beginning of what is normally termed the chassis assembly line.

Small parts, tools and supplies such as nuts and bolts, are stored *under* the conveyor and moving frame assembly as well as at the sides in multiple shelf racks. Thus, valuable space is made available, and perhaps 50 per cent more parts and tools are within easy reach of the assemblers. Practically no nonproductive time and steps are required to bring a part to the frame.

### Advantages of Overhead System

It should be pointed out here that this could not have been accomplished with the conventional chassis line floor type conveyor. Both the floor tracks and the moving return chain required underneath left no space for parts. Furthermore, the rails and moving chain did not permit operators to walk from one side to the other of the frame assemblies anywhere along the line. Passing through the line meant a long walk around, or a climb over the assembly which could not be accomplished too safely—nor while pushing a hand truck or carrying tools.

With the frame assembly suspended from the overhead conveyor anyone is permitted to pass in, out and through the line at any point between the frames. Possibly the most important feature of this is that assemblers working at either end of the frame can actually stand there to complete the job without reaching from the side.

For a few hundred feet miscellaneous small parts are assembled and welded on to the frame. Whenever work is done on top of the frame the conveyor dips the assembly downward to eliminate reaching during the work. When work is done near the bottom of the frame, the conveyor slopes upward to the most favorable working height.

Not far along the line the layout of the plant requires the conveyor to make a horizontal curve of 90 degrees. On a conventional floor system this would require a complicated automatic transfer to another powered conveyor or separate lifting operation involving a number of men. In the new system, this turn is a simple roller turn involving no transfers, and assemblers still continue

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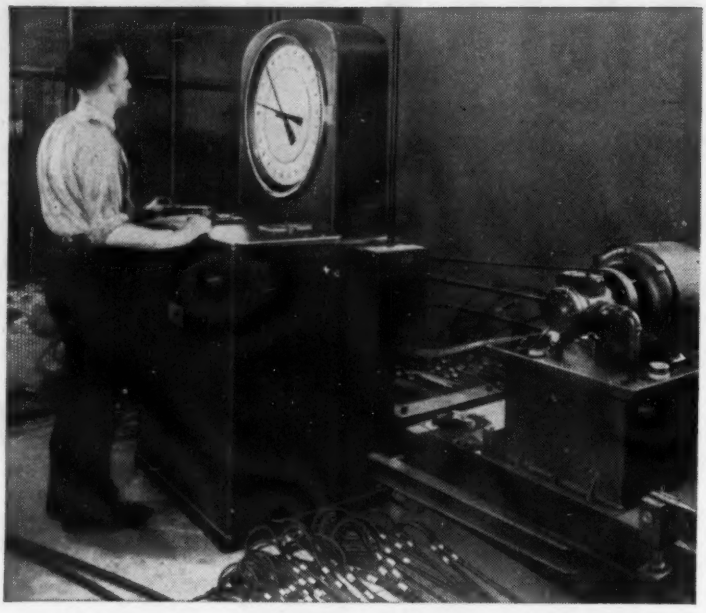
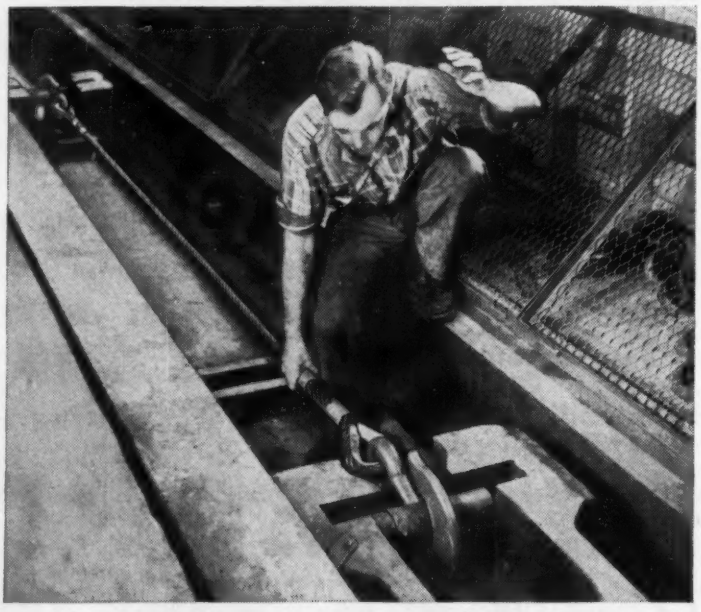


*Inspector reads load on dial as ACCO Registered Wire Rope Sling is proof-tested to double its rated capacity. Individual tests prove strength—assure safe slings.*



*Engineer signals for start of proof-test of ACCO Registered Strand-Laid Sling with thimble loop at both ends.*

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to work as the chassis goes around the curve. Ten or more of these turns could be incorporated if the building plan and plant layout required them. In fact, the chassis line is just as flexible as the overhead conveyors employed to carry fenders, hoods, wheels and other parts in every direction and up and down vertically.

Motors join the chassis line just beyond the turn. The stripped-down motors as they arrive from other Chevrolet plants, are loaded onto a standard overhead conveyor that moves continuously in a loop from the loading point to the chassis line. As the conveyor approaches the chassis, all parts such as generators, fans, belts—everything to complete the motors—are assembled. At one point along the line the crankshaft is rotated at speed for valve lashing. This is done while the engine is moving along the overhead conveyor line.

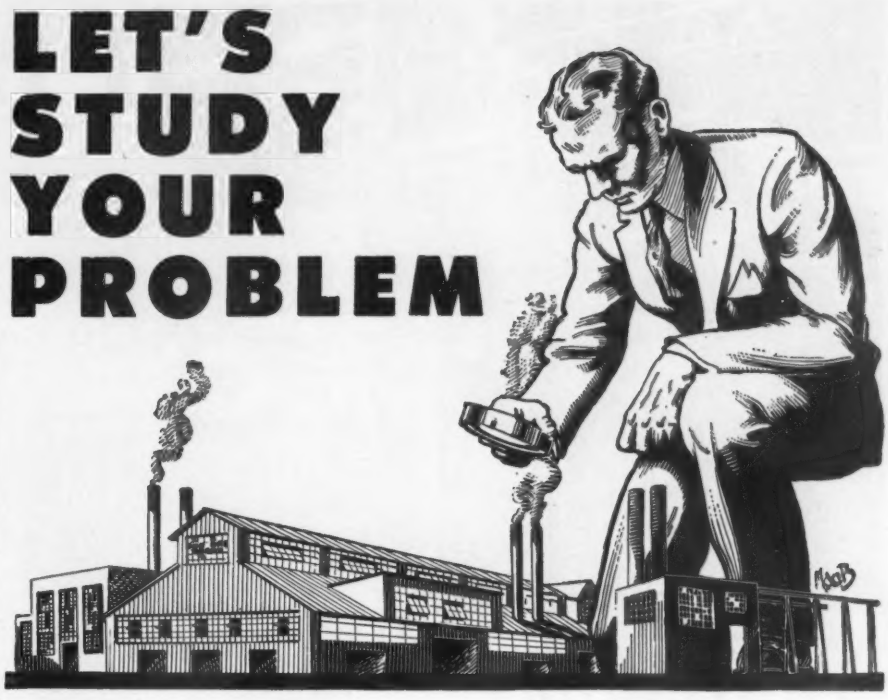
### Valve Lashing Crankshafts

In the operation, a small electric motor drive is suspended from a free trolley on an I-beam track running parallel and adjacent to the moving overhead conveyor. The output shaft of the motor is quickly coupled to the engine crankshaft; the electric motor is started and the engine operated by crankshaft rotation. In the meantime, the suspended trolley is towed by this connection to the engine which in turn is traveling on the moving overhead conveyor.

After being inspected, the motor is removed from the overhead conveyor and lowered into the chassis by means of a simple hoist transfer. The overhead motor line returns to the loading station, by a separate path. It may be used to return back to shipping or reassembly any motors that do not meet inspection requirements. This feature is not possible on the conventional motor assembly line.

Upon installation of the motor, the chassis is conveyed to the paint spray booth, through which the conveyor carries the frame at a uniform rate. The conveyor itself is up and out of the way of the actual spraying; hence, its rail and moving parts are in large measure clear of the paint spray. In the floor type system, the paint spray collected and piled up until it gummed up bearings. In general, it carried wet, sticky paint all over the assembly operations. Cleaning factor was so great that many production engineers feel it is necessary to have the spraying done on a separate conveyor. Such a move would involve much rehandling just to avoid carrying the accumulated paint all through the productive system.

Paint spray and fumes are blown away from the operator into a water wash which precipitates excess paint and ex-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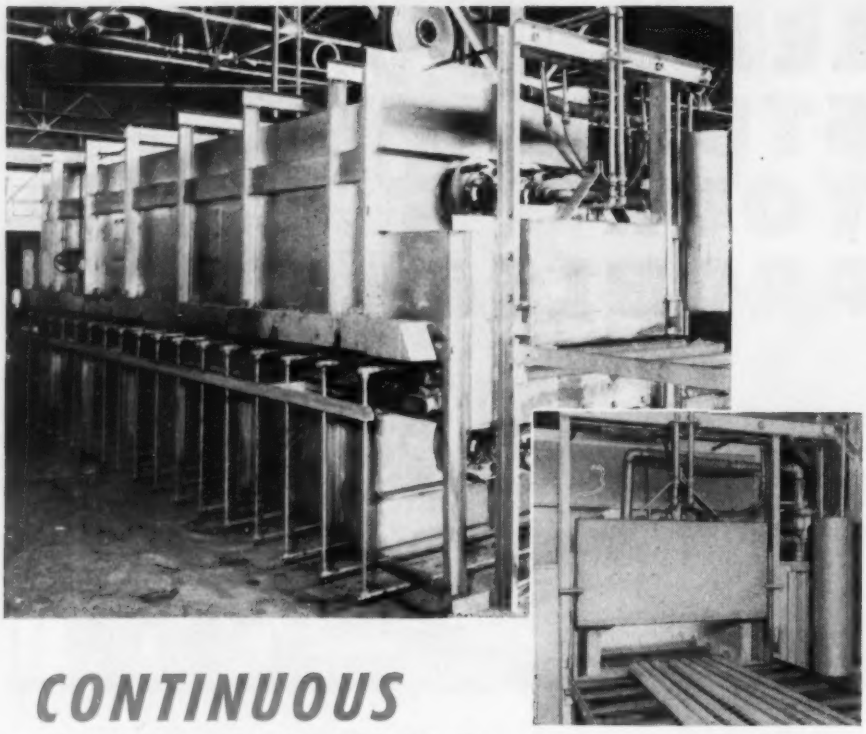

Continuous annealing of welded stainless steel tubing with gas heat at 2000° F.

# CONTINUOUS GAS FIRED TUBE and ROLLER ANNEALING FURNACE

## Operates at 2000° Fahrenheit

This continuous, gas fired annealing furnace in a large steel plant in the Great Lakes area, operates at 2000° F. and over—yet production and fuel consumption compare favorably with other types of annealing units, and maintenance costs are substantially less.

These economies have been achieved through the use of "CARBOFRAX"* Refractory Radiant Tubes and Conveyor Rolls—a new and important feature of GASMACO Furnaces into which they are engineered.

"CARBOFRAX"* Refractory Radiant Tubes reduce costly replacement charges inevitable with alloy combustion tubes. They also permit tube firing at temperatures in excess of 2500° F.—substantially higher than the economic limit of alloy tubes. "CARBOFRAX"* Rollers carry heavier hearth loads in the furnace without oscillation and with fewer replacements.

It will pay you to investigate these outstanding features of GASMACO Furnaces on your next heat treating problem. Our engineers are available at any time.

*"CARBOFRAX" is a registered trademark indicating manufacture by the Carborundum Company.

*Write for Folder A-100 which shows the complete line and describes various furnace applications*

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hausts cleaned air. The work height (at bench level) is such that the operator can spray from above and also underneath without turning over or handling the chassis in any way. If necessary, the overhead conveyor may be adjusted to rise or dip down to provide the operator with the most efficient working heights at all times.

Practically every assembly line in the automotive industry employs different methods of assembling finished wheels to the chassis. Systems using the floor type conveyor require chutes, extra conveyors, or permanent storage banks on both sides of the line in order to get the wheel and tire in position to bolt on at the four points. Often, the continuous rails and chain on the floor conveyor left no space in the line where the wheels could be brought through. At Chevrolet the operation is now very simple. A straight gravity roller conveyor maintains an ever available bank on one side of the line. As the assemblies travel along, operators simply roll two tire and wheel assemblies between the chassis assemblies and keep two others and a spare on the near side where they are in convenient reach.

### Two Final Assembly Lines

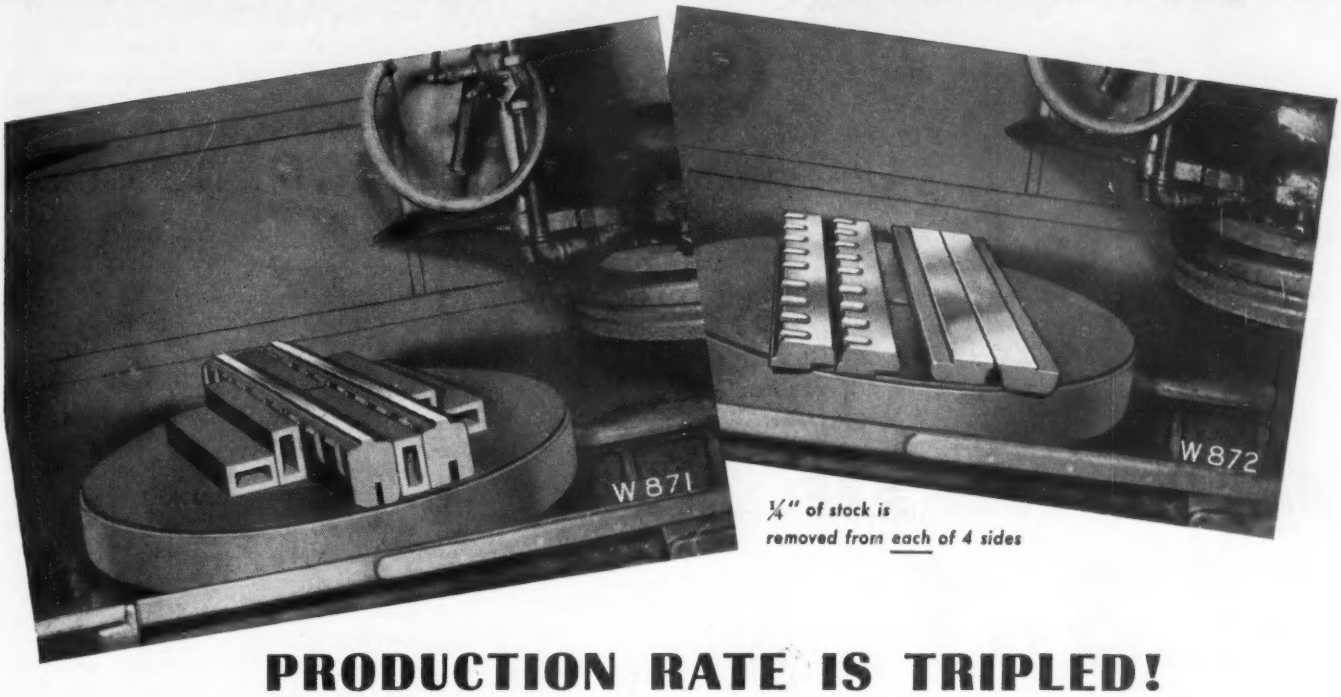
Flexibility of the power and free overhead conveyor system is greatly emphasized at the point where the chassis is completed and fed to the final assembly line. Chevrolet engineers found, in laying out the plant, that better efficiency in passenger car assembly would be accomplished if there were two final car assembly lines to each chassis line. Because of the more meticulous and time-consuming work necessary on the final lines, these two lines travel at about half the speed of the chassis line.

In syncronizing the three lines automatically, the power conveyor pushes the chassis into an air-operated automatic track switch and then leaves the conveyor system.

Switch automatically thrusts alternately one chassis on one line and one to the other final line. Each of the chassis, now traveling on a free line, proceeds by gravity to an automatic air drop section. Here it is lowered automatically at the start of the final assembly line, where it now rests on its own wheels. From here it travels uniformly on the conventional floor pallet type final assembly conveyor.

After depositing its load, the empty chassis carrier is disengaged and is raised automatically by the same air drop and lift section high in the air. There it "flows" on its trolley by gravity to a switch which feeds it and the other carrier returning from the other final assembly line alternately on to a single

# Put it on the Blanchard




*¼" of stock is removed from each of 4 sides*

## PRODUCTION RATE IS TRIPLED!

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***ANOTHER BLANCHARD "ROUGH-TO-FINISH" JOB . . .*** **IF YOU MACHINE FLAT SURFACES, INVESTIGATE BLANCHARD GRINDING for finishing them from the "rough" (casting, forging, torch cut, etc.) to the smooth, flat, *sized* finish in one handling—one operation.**

**The above illustration shows one actual example of Blanchard cost-cutting "hogging". The parts are cast iron Bearing Gibs, held by simple blocks on the 36" diameter magnetic chuck of a No. 18 Blanchard Grinder. Each gib half is 36" x 4" x 1⅝".**

***One-quarter inch*** **is removed from each of the four sides. The finished edges must be accurately square with the sides.**

***THE PRODUCTION RATE ON THE BLANCHARD IS 33 TIME UNITS PER PIECE, AS COMPARED TO 100 TIME UNITS PER PIECE WHEN MACHINED BY THE FORMER METHOD.***

**We'll be glad to study *your* flat surface grinding problems—give you reliable production data—and grind samples for you. Without any obligation on your part!**

**Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.**

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# 18-8

## AND THE ODDS ARE

## ...3 TO 1....

THE odds are 3 to 1 that castings made from one of the famous Circle Ⓛ "18 and 8" alloys will do a better and more practical job in resisting corrosive conditions than those made from any other formula.

We pour a lot of alloy tonnage out of our electric induction furnaces in the course of a month. Some of it is very special stuff. All of it is carefully matched to the exact service conditions of the equipment and machinery into which the castings are fabricated. A study of our records proves beyond a doubt that our Circle Ⓛ "family" of "18 and 8" alloys tops the list as the practical, economical corrosion resistant material.

The Nominal Analysis and Nominal Physical Properties of one of these, Circle Ⓛ 22, are given at left. However there are many variants of this approximate analysis which make possible its successful application to a wide range of service conditions. They are summarized on the new Circle Ⓛ Alloy Data Sheet, sent upon request.

**LEBANON CIRCLE Ⓛ 22**

**NOMINAL ANALYSIS**

| | |
|---|---|
| Carbon Max. | 0.07 |
| Silicon | 1.25 |
| Manganese | 0.75 |
| Chromium | 19.50 |
| Nickel | 9.00 |

**NOMINAL PHYSICAL PROPERTIES**

| | |
|---|---|
| Tensile Strength | 75,000 |
| Yield Point | 36,000 |
| Elongation in 2"—% | 50 |
| Brinell Hardness | 135 |

**LEBANON STEEL FOUNDRY, LEBANON, PA.**
*"In The Lebanon Valley"*
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

**LEBANON** ALLOY AND STEEL **Castings**

CIRCLE L


free line. Once on the free line again the carriers are picked up by the same power overhead trolley conveyor and pushed back to the head of the chassis line from which it started.

All in all, there are 4½-miles of conveyor of all types in this plant, only ½-mile is represented by the floor type. Although immediate advantages were discussed there are many others. Having all handling equipment up and out of the way impresses everyone with a feeling of spaciousness. Floor space is conserved to the n'th degree, and no one is confined or cut off from other parts of the plant. The far reaching effect of this freedom on employee relations and their productivity might very well dwarf all other savings.

In the auto industry the suspended assembly permits right side up assembly of the chassis from start to finish. At Chevrolet, it will be simple to revise layouts, and at less cost. Changes in manufacturing methods will not require major building alterations, etc. The overhead conveyor system allows any number of turns—horizontal or vertical—to be simply and inexpensively added or subtracted to suit the needs. Products may be taken from the mezzanine or transported up and above high head room clearances to a remote part of the building and lowered there for whatever operation is required. All this can be done with no break in the mechanically timed continuous flow from start to finish.

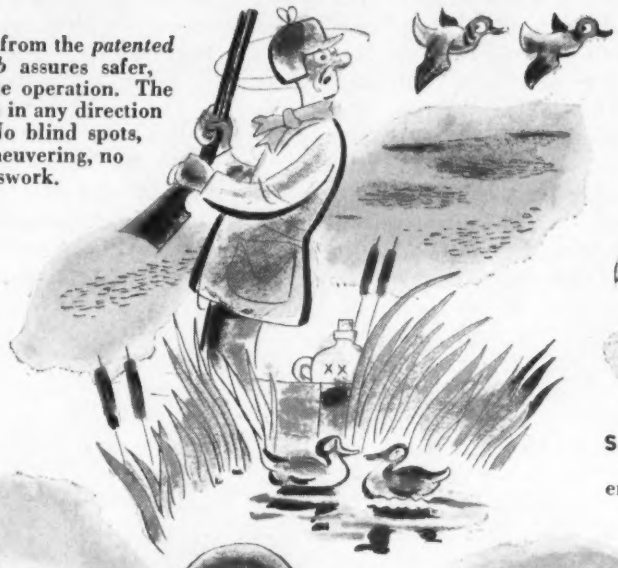
Errors on the line, lack of supplies, assembly difficulties, for example, are easily by-passed as the chassis is never fastened to the conveyor line. It is just pushed and a simple manual operation of collapsing a dog will hold the carrier in stationary position, or if necessary enable it to be pushed manually at any speed to dogs spaced ahead. Temporary bottlenecks of one sort or another on the line may be discovered quickly, but still the line need not be stopped.

In this particular plant, the system plays a major role in the production of one passenger car every minute. Engineers in other industries well aware of the potentialities of a mechanical time flow product will study and experiment with this type of conveying. The end result will be inevitable—increased productivity, but lightened labor—a significant and real step toward a better standard of living.

—o—

Approximately 750 tons of steel and more than 100 miles of copper wire went into the construction of the 108,000 kilowatt generator recently completed by Westinghouse Electric Corp. for an increase of 146,000 hp generating capacity for Grand Coulee Dam

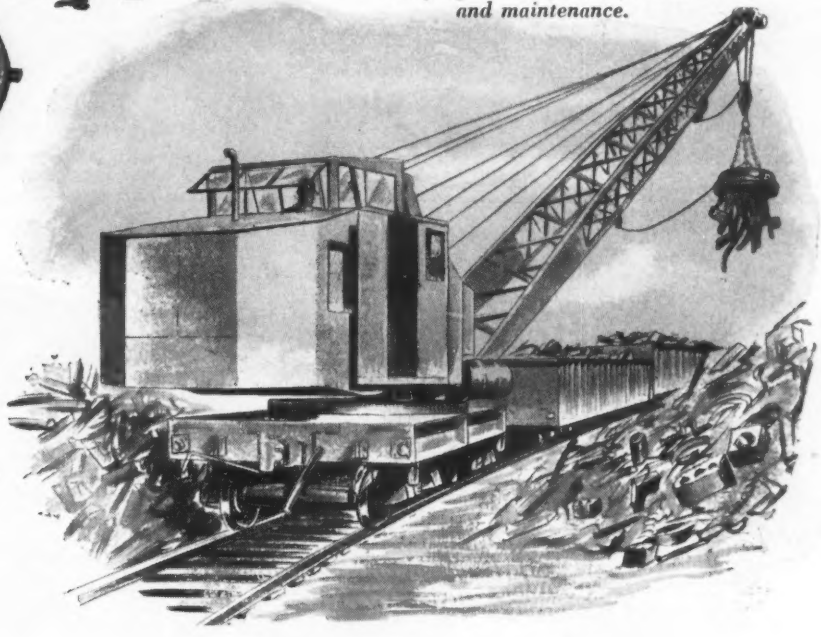
# BROWNHOIST GIVES YOU MORE FOR YOUR MATERIAL HANDLING DOLLAR



**360° VISIBILITY** from the *patented Monitor-type cab* assures safer, faster, easier crane operation. The operator can see in any direction at a glance. No blind spots, no awkward maneuvering, no dangerous guesswork.

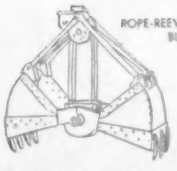
**SMOOTH, EASY SWING** of the Brownhoist Diesel Locomotive Crane cab means an end to sudden grabbing which makes spotting of loads difficult. It minimizes hazardous swaying of lifts, *reduces wear and maintenance.*

**HUSKY RUGGEDNESS** of construction from trucks to boom tip absorbs the shock and strain of capacity loads, helps keep maintenance costs to a minimum, makes the Brownhoist Diesel Locomotive Crane *your best long-term investment in economical material handling.*

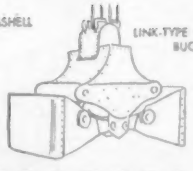


**Join the long** list of crane owners who are capitalizing upon the many Brownhoist *engineering and construction advantages* such as (1) 360° visibility; (2) positive response to air-operated controls placed within easy reach of the operator; (3) one-piece cast steel bed; (4) rotating and travel friction disc clutches with 1-point adjustment; and (5) 14″ safety clearance between rotating bed and car body. *Write for complete facts.*

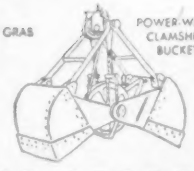
## BROWNHOIST BUILDS BETTER CRANES



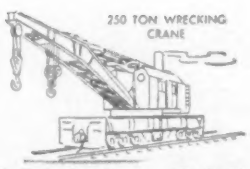
ROPE-REEVE CLAMSHELL BUCKET



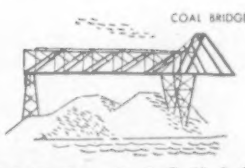
LINK-TYPE ORE GRAB BUCKET



POWER-WHEEL CLAMSHELL BUCKET



250 TON WRECKING CRANE



COAL BRIDGE

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## Unconventional Dies

(*Concluded from Page 79*)

lower die assure enough rivet spread for proper electric contact with the side copper. The press which uses rubber knockout has a chain safety device to prevent operator injury in case stud should break.

Another example of good die design is the expanding punch. This involves a different type of toaster frame than that already discussed. The first form is in a U-shape. Problem is to form the complicated final shape without excessive wrinkles in the corners of the finished frame which is later given a high chrome final polish. Working surfaces of the die are given a high chrome plating for extra die life. Production on this punch press averages 400 per hour. Work is accomplished on a 50 ton straight side press, Fig. 2.

Two spring-mounted plungers, exerting sufficient pressure through these springs to form the top of the frame, are actuated by the descending ram to create a wedging action which expands through the outside blocks of the die, giving the desired forming of the corners without excessive wrinkling. Rejects are less than 2 per cent.

Grill stove tops are formed of 0.050-in. SAE 1010 steel; problem is to avoid springbacks and splits. The die involved was built to handle 0.045-in. material. Blank size to start is 10 x 18 in. and the draw is 1½-in. This part is drawn and bench-trimmed in one operation.

In the second operation, two burner wells are drawn, Fig. 3, one at a time in a work and turn technique. The special well shape requires all the metal to be taken from the center of the blank. Action is to perforate a small center, draw and flange in one operation. Due to the excessive stretch, best grades of steel are required to accomplish this shape without splitting. A special deep-draw steel is used. Work is drawn in a 100 ton double-strength straight side press at the rate of 150-200 pieces per hour, using air cushions to provide blank holding pressures. The wells are drawn on a 75 ton straight side press at 300 per hour, using the same air pressure holding devices.

Perhaps the most complicated fabrication job is that of the bullet-shaped fan cover, from 0.035-in. SAE 1010 deep drawing steel. Due to the special cover requirements involved, enclosing the oscillating mechanism of the fan components, the complete housing takes irregular form.

The fabrication of this cover calls for four draws to complete, plus an added operation to achieve the varied holes and louvres of each particular model. The first draw is conventional except that it forms a flange, needed to provide sufficient holding area for subsequent draws. Blank size is 8¾-in. diameter, 0.030-in. thick. The draw is made on a 75 ton straight side press with air cushion pressure as the blank holding technique. This first draw is 4½-in. in diameter, 3 in. deep with a ⅝-in. flange.

The second draw starts from the nose, reduces the shell to 3⅝-in. diameter, 2⅜-in. long, leaving the rest of the cup as obtained in the first draw. The third draw forms the bullet shape part of the way, creating a conical form having some wrinkles left in part of the cup. This brings total depth to 4½-in. It is necessary to leave the flange for holding the fourth and final draw, giving enough pressure area to stretch so that the final shell will come out sufficiently smooth to give good surface to paint covering.

The final draw brings down the last part of the flange, pinch trims the cover to required length. This is 4⅝-in. deep on a 3¾-in. diameter of the round section with a nose extending ¾-in. high tapering into the contour. The nose is 2¼-in. wide. Production is 300 per hour. A 75 ton straight side press with air holders is employed on all draws.

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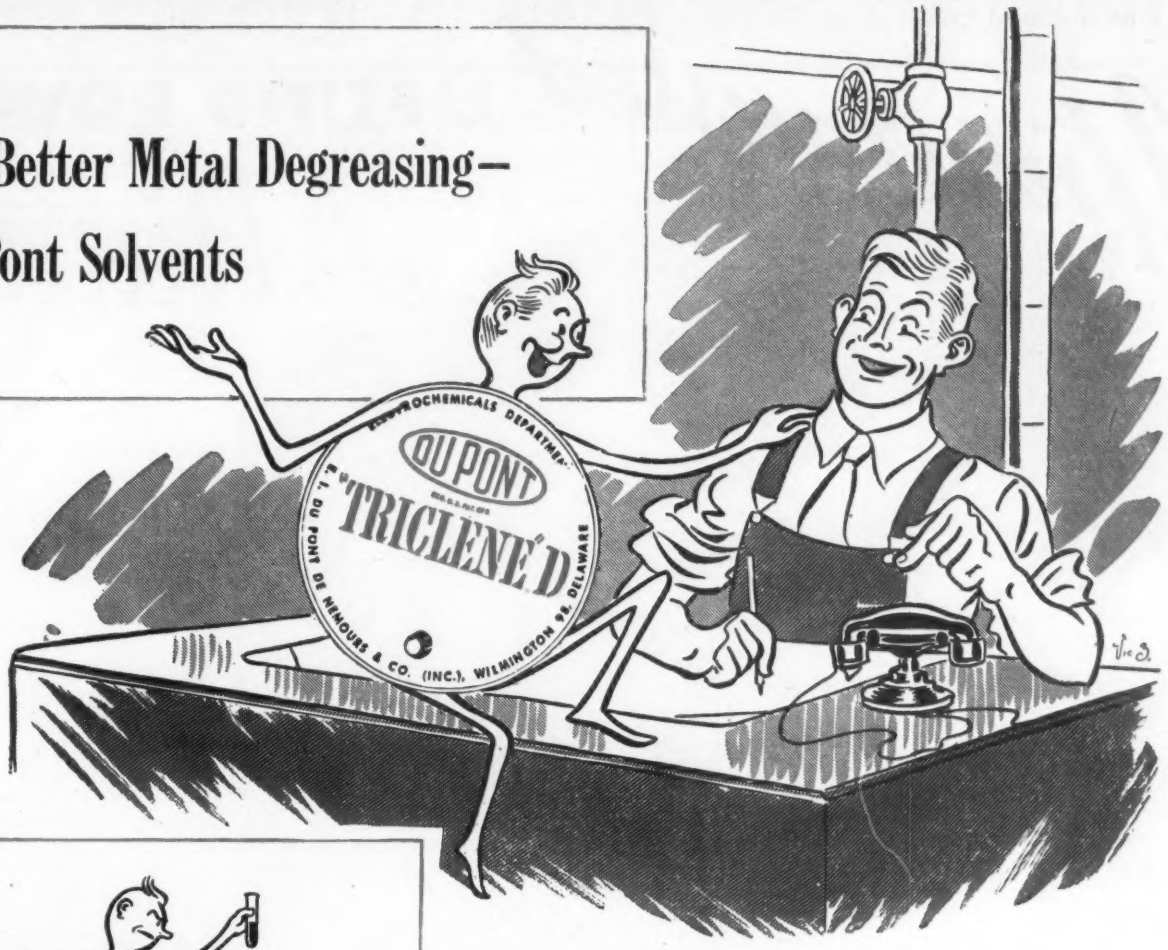
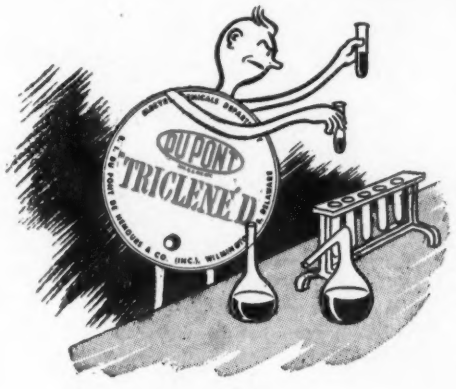
# Du Pont Solvents




**NOW** Du Pont has developed an improved Trichlorethylene which is BETTER THAN EVER. This product and Perchlorethylene are two fine solvents. They are the best Vapor Degreasing solvents we've ever made—the best we know how to make. Use them with complete confidence and assurance for all metal degreasing work. We believe they'll serve you *better!*

**UNDER VARIOUS TRADE NAMES,** Du Pont Trichlorethylene and Perchlorethylene solvents for metal cleaning have served American industry successfully for many years. If you have used vapor degreasing solvents in your plant, no doubt you have used these solvents made by Du Pont.

**LOOK TO** the service offered by Du Pont and by distributors of Du Pont solvents to help you conserve your solvents through effective and economic operation. Send *today* for your copy of "Metal Degreasing—Standard Practice." E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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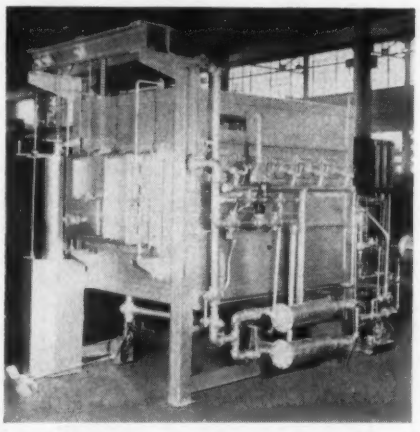
# New Products and Equipment

*Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 126*

## 1. Atmosphere Furnaces

Featuring RX gas as the protective atmosphere which, in addition to being nonoxidizing, has a carbon potential which may be accurately controlled to be in perfect balance with a desired carbon content of steel, new Balco atmosphere and carburizing furnaces, developed by Surface Combustion Corp., Toledo, O., make possible a scale-free, heat treated product.

Atmosphere is produced by a process which consists of passing rich air gas



mixture of either natural or petroleum gas through a heated tube filled with a catalytic refractory material. Resultant atmosphere is composed of about 20 per cent carbon monoxide, 40 per cent hydrogen and 40 per cent inert nitrogen. Enrichment is possible for high carbon balances.

Furnaces are of horizontal muffle type, externally fired with RX generator built as an integral, but separately heated, part of the unit. They are of two general types: Superheat, series BRS (2000 to 2400° F) and general heat treat, series BRG (1400 to 1850° F).

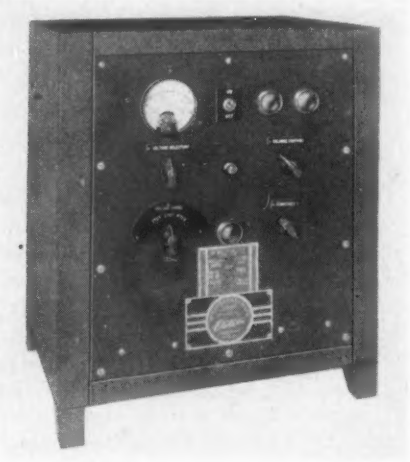
## 2. Gas Filled Motor

Inert gas filled synchronous motors for use in an inflammable atmosphere are being made by General Electric Co., Schenectady, N. Y., with all features incorporated in one unit. A built-in cooler and a sealed chamber filled with a noncombustible gas under sufficient pressure to cause any leakage to be outward are within the motor enclosure.

By removing only one access cover, the field leads, stator leads, terminal boards and bridge resistors for temperature relay are within easy reach. The inert gas follows unrestricted flow lines in the cooler, located over the motor, to give efficient heat transfer. Resistance temperature detectors are imbedded in the stator windings to remove the motor from the line in the event the cooling water is not turned on or if the temperature of the windings becomes excessive for other reasons.

## 3. Voltage Regulator

Maintenance of constant direct current output voltage regardless of ampere load current is a feature of the automatic voltage regulator introduced by Richardson-Allen Corp., 15 West 20th street, New York 11. The regulator has maxi-



mum regulation sensitivity; a voltage change of plus or minus 1/10 to ¼-volt will cause instantaneous control reaction.

Other features include a voltage selector or preset switch, pilot light showing changing loads, low power consumption and easy handling. Equipment is designed for 115 volt, single phase, 50/60-cycle alternating current input. Standard model is for 1 to 9 volts direct current.

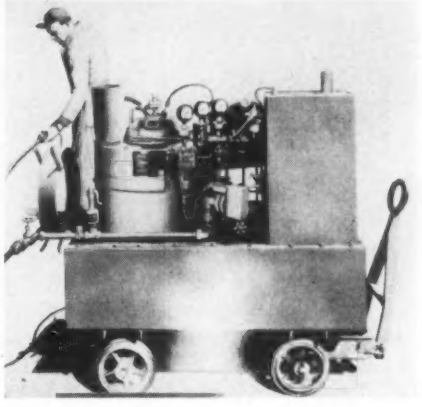
## 4. Dryer or Cooler

Link-Belt Co., 307 North Michigan avenue, Chicago 1, announces the Multi-Louvre dryer (or cooler) for materials requiring short treatment time and/or multiple drying temperatures. It will dry cool and process materials in the same unit. The moving element in the dryer consists of two strands of roller chain with specially designed flights, suspended so as to provide a means for keeping the bed in a constantly flowing mass. Material flows in a shallow bed over the ascending flights and at the same time is moved across the dryer from the feed point to the discharge point.

Gases are pulled from the furnace and permeate through the moving bed of material. At this point the heat from the inlet gases is transferred to the material and the moisture evaporation takes place. Entire area of dryer is covered by the exhaust fan suction. A wide variation of temperatures may be used. Unit may use steam coils, gas or oil furnaces or even coal fired equipment as a source of heat.

## 5. Steam Cleaning Unit

One-minute generation of 100 lb steam pressure, simultaneous two-gun steam cleaning and paint stripping, mobility and ease of operation are features of vapor steam cleaning unit introduced by Oakite Products Inc., 22 Thames



street, New York 6. Fired by domestic fuel oil, gasoline or kerosene, unit is powered by heavy duty electric motor. It is mounted on deck plate of water supply tank with water and fuel pumps, magneto, etc.

Starting motor starts machine. Next operation is to turn on throttle to start steam generation and set it for pressure. All other controls are automatic and need no adjustment. Choice of wet or dry steam is made by the throttle.

Model 384 is one of two types of guns available, it being supplied with 3½, 4½ or 5½-ft gun, 25 ft of steam and solution-lifting hose, couplings and cleaning solution strainer. Cleaning solution is prepared in a separate drum and automatically lifted to the gun nozzle where it combines with the machine generated steam. Model V gun has 25 ft of steam hose with couplings, one 4 in. and one 2 in. flat spray nozzle and one round

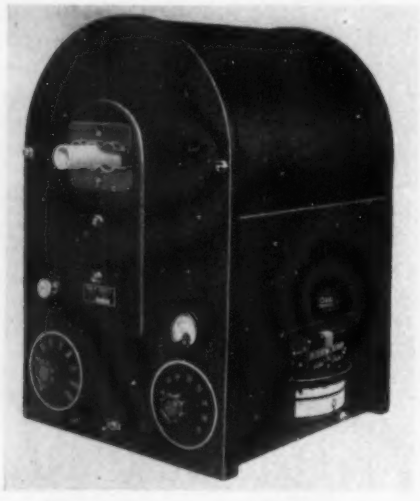
type Venturi nozzle with ½-in. orifice. When using this gun, cleaning solution is made up in the tank of the machine.

## 6. Rubber Tired Wheels

Available with sealed ball bearings, plain bronze or oil impregnated sintered bronze bearings, rubber tired wheels for industrial uses are being made in sizes from 4 to 14 in. extreme diameter and from 1¾ to 3 in. diameter of tire section by Champion Iron Works Inc., 2223 Gratiot avenue, Detroit. Maximum standard bore is 5/8-in. Tires are demountable with hand tools.

## 7. Combustion Furnace

Reproducibility of carbon and sulphur determination by the combustion method may be improved by insuring that the temperature at which samples are burned is ample and held at an exact tempera-



ture, as is done in the Varitemp combustion furnace, introduced by Harry W. Dietert Co., 9330 Roselawn avenue, Detroit 4.

Equipped with an electronic automatic temperature controller, it meets demand for combustion of test samples for either carbon or sulphur determination in inorganic or organic materials. Combustion temperatures are maintained within 3 per cent at any selected temperature up to 2700° F.

## 8. Materials Handler

Capable of handling coal, concrete, gravel, lumber and scrap, erecting steel, removing snow or pouring concrete from its own hopper, the improved Scoopmobile, designed by Mixermobile Manufacturers, 6855 North East Halsey, Portland 16, Ore., features Vickers hydraulic power steering (optional) which eases handling on rough terrain, with big loads and with high loading. Quick change attachments convert the machine into five different type machines.

Handler has an enclosed cab with safety plate glass windshield and door on each side. Bucket has shovel action which facilitates loading. Control of all operations is by hand lever. Machine may be towed from job to job by a light or heavy truck. It will lift a 4000-lb

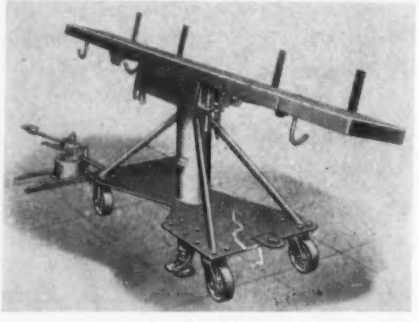
load to 7 ft 9½-in. or ¾-yd as high as 17½-ft. Lift fork, crane boom, concrete hopper, fertilizer fork and various sized buckets are available attachments. Track extensions are available in units of 6, 8 and 10 ft lengths.

## 9. Cast Iron Flux

For gas welding, a paste cast iron flux which is painted on the clean surface of the cast iron while the casting is still cold is available from All-State Welding Alloys Co. Inc., 96 West Post road, White Plains, N. Y. Cast iron welding rod may also be painted with the flux. It protects against surface oxidation and prevents porosity in the finished weld.

## 10. Sheet Feeding Table

Lyon-Raymond Corp., 3548 Madison street, Greene, N. Y., is manufacturing a hydraulic strip and sheet feeding table with an adjustable tilting top for use with inclined presses as well as with horizontal



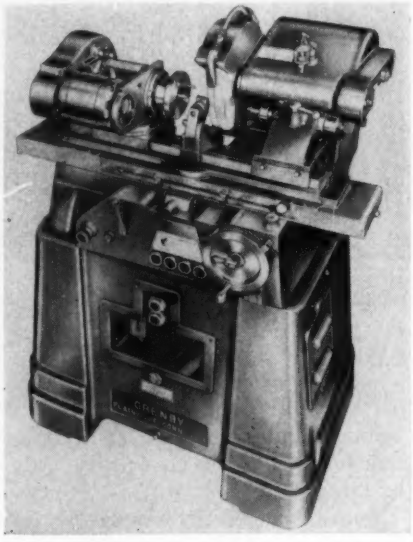
bed types. Offered with a capacity of 2000 lb in table widths from 12 to 24 in. and lengths up to 96 in. (including removable extensions), its top may be adjusted to a 30 degree tilt.

In operation using inclined presses, it is possible to feed strip or sheet stock at the correct angle with full support and proper leveling. When correct angle of tilt is determined, table top is locked in position by removable pins. It may be elevated and lowered at all times.

## 11. Hydraulic Grinders

Features such as live spindle work head that takes 5C-1 in. collets and swivels 90 degrees either side of center, a taper bayonet lock spindle note for three and four-jaw chucks, face plates and dead center attachment are noted in the announcement of the EG-103 external and the IG-103 internal hydraulic grinders made by Grenby Mfg. Co., Whiting street, Plainville, Conn. Either machine may be equipped with two heads to make a combination internal-external grinder.

Capacities are: Internal, 3 in. diameter by 4 in. long; external, 3 in. diam-



eter by 10 in. long. Both machines can grind work up to the full swing over the table of 9-in. diameter. Grinding wheel head swivels 15 degrees and a ¾ hp motor drives the 10 x 1 in. external wheel or the 15,000 and 32,000 rpm internal spindles. Hand and power cross feed in 0.0001-in. are standard equipment. Table has infinite speed changes from 0 to 100 ipm.

## 12. Safety Goggle

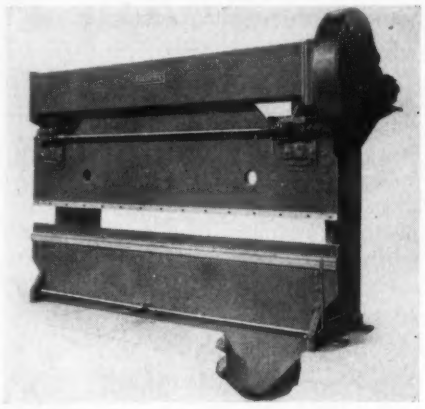
Designed to meet safety and optical standards, a new F9200 series spectacle type safety goggle, made by American Optical Co., Southbridge, Mass., has an acetate frame which provides a more exact fit, increased comfort and better appearance. Goggle features a key-hole bridge which is strong but light in weight.

Comfort cable temples and skull temples which consist of a strong wire core encased in acetate and pliable for quick adjustment, are offered. Either 6-curve

clear or Calcbar super armorplates lenses are available with the goggles.

## 13. Power Press Brake

Motor driven slide adjustment with both motor and controls readily accessible is a feature of the power press brake introduced by Columbia Machinery & Engineering Corp., Hamilton, O. The slide may be adjusted out of parallel



with the base, magnitude of adjustment showing on indicators located on each end. Operation is by multiple disk friction clutch and friction brake.

Slide and base have a maximum deflection of 0.001-in. per foot of machine width. All gears are machine cut and operate in oil. First driving gears are helically cut. Eccentric shaft is a heat treated high carbon steel forging.

The 120 ton capacity brake operates at a speed of 30 strokes per minute. It is regularly furnished with flywheel for belt drive but it may have an individual motor drive with a 10 hp, 1800 rpm, high-torque, high-slip motor. It will form mild steel in the following sizes: $\frac{7}{16}$-in. by 4 ft, $\frac{5}{16}$-in. by 6 ft, ¼-in. by 8 ft and $\frac{3}{16}$-in. by 10 ft.

## 14. Silicon-Copper Electrode

Having superior flowing characteristics, the new Airco No. 23A silicon-copper welding rod, introduced by Air Reduction Sales Co., 60 East 42nd street, New York 17, will produce strong welds as well as provide an excellent color match on copper. It is available in 1/4, 3/16 and 1/8-in. diameters.

## 15. Shop Cart

Shavings, scrap, waste, rags, tools, machine parts, fabricated products, packaged goods, etc., may be handled easily in the two-wheeled pick-up shop cart made by Milcor Steel Co., Milwaukee 1. Front can be tilted down to the floor for fast, easy loading and unloading and material may be swept, rolled or pushed in. Handle acts as a lever to raise load up onto the wheels.

Other uses of cart are for janitors, window washers, fire fighting equipment, draining oil from motors, etc. Constructed of heavy gage sheet steel with a baked enamel finish, it has a tubular steel handle, wide rubber tire wheels and a body top 18¾ x 28 in. Depth is 16 in.

## 16. Portable Crane

Designed for lifting up to 3000-pound loads the new type CXR electric crane, announced by Baker Industrial Truck Division of Baker-Raulang Co., 2168 West 25th street, Cleveland 13, is suitable for operation in shop, stores department, railroad engine house, car loading and unloading, etc. Platform of crane is

large enough to support items which must be transported any distance.

Safety of operation is assured by good vision, a protecting guard for the operator and automatic limit stops and brakes for all motors. Operators are compelled to use acceleration steps in operation, reducing maintenance and saving power. Interlocked with controller and brake is a contactor which makes and breaks the travel motor circuit, minimizing burning of controller contacts, since arcing is confined to contactor.

## 17. Hydraulic Cylinders

Hydro-Line Mfg. Co., Rockford, Ill., is announcing a line of standard hydraulic cylinders with centrifugally cast bodies of semisteel having a tensile strength of 40,000 to 55,000 lb. All are bored and honed and are available with all conventional types of mountings. Cast iron piston has four automotive type rings. Rated at 1500 psi, the line ranges from 1½ to 8 in. bore with strokes to suit.

## 18. Tank, Rack Coating

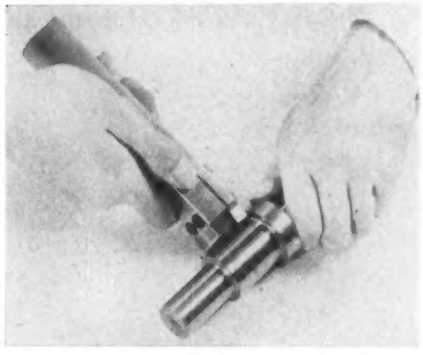
Tanks and rack fixtures used in plating and chemical industries may be made to resist sulphuric, hydrofluoric, hydrochloric, nitric and chromic oxidizing acids if coated with Heilex 445 vinyl type coating developed by Heil Process Equipment Corp., 12903 Elmwood avenue, Cleveland 11. Rubbery and tough, it has high bonding characteristics and will resist abrasion and rough handling. Temperatures up to boiling have a negligible effect upon it.

## 19. Industrial Apron

A lightweight, easy-to-wear industrial apron made of flexible synthetic Koroseal film is announced by B. F. Goodrich Co., Akron. It is resistant to acids, greases, oils, caustics, gasoline, animal and vegetable fats, butter fats, solvent and soaps and will not become stiff or tacky. It may be sterilized in a disinfecting solution. Apron is made in two sizes, 29 x 35 in. and 35 x 45 in.

## 20. Ejector Type Tool

Vertical tools which present one side of their square carbide insert to the cut and which by rotating the insert and then inverting it present a total of eight cutting edges before resharpening, are produced by Super Tool Co., 21650



Hoover road, Detroit 13. Made in six sizes, these ejector type tools, using 3/8-inch square insert (standard for all size holders) can cut to a depth only slightly under 3/8-inch.

In addition to producing a fine finish in both roughing and finishing, the tools may also be used for facing cuts and for turning to a shoulder. Horsepower requirements are the same as for other single points turning tools.

## 21. Demand Mask

Self contained, the front type demand mask for short duration protection in gaseous or oxygen deficient atmospheres, is made by Mine Safety Appliances Co., Pittsburgh 8. Weighing 13½ lb, it has an 11 cu ft capacity high pressure cylinder which has a service life of about 8 to 10 min.

Attached is a demand regulator which delivers an oxygen flow exactly as needed by the wearer. A needle type bypass valve delivers oxygen to the worker in case the automatic functioning of the demand regulator should fail. Oxygen

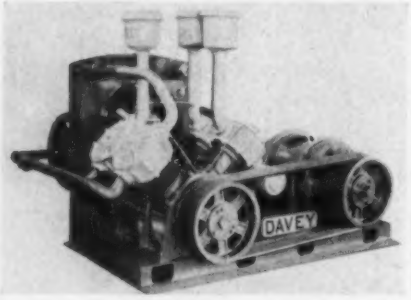
supply is continuously registered on a readily-visible pressure gage attached to the regulator. The flow of dry oxygen over the facepiece lenses keeps them from fogging.

## 22. Oil Resistant Clothing

Impervious to oils, grease and water and highly resistant to acids, alkalies and chemicals, Gardwell Oil-Chem aprons and clothing, made by Safety Clothing & Equipment Co., 7016 Euclid avenue, Cleveland 3, are made of pliable plastic material, brown in color and 0.015-in. thick. Apron is available in bib or waist style, in a wide range of sizes. Sleeves, coats, pants, overalls and jumper suits have double sewn seams. Coats open at back, leaving front free of seams.

## 23. Air Compressors

Two-stage, air cooled industrial air compressors of 60, 105, 160, 210 and 315 cubic feet per minute capacities and featuring permanent peak efficiency valves and an Equi-Balanced crankshaft are announced by Davey Compressor Co., Kent, O. Use of this crankshaft plus



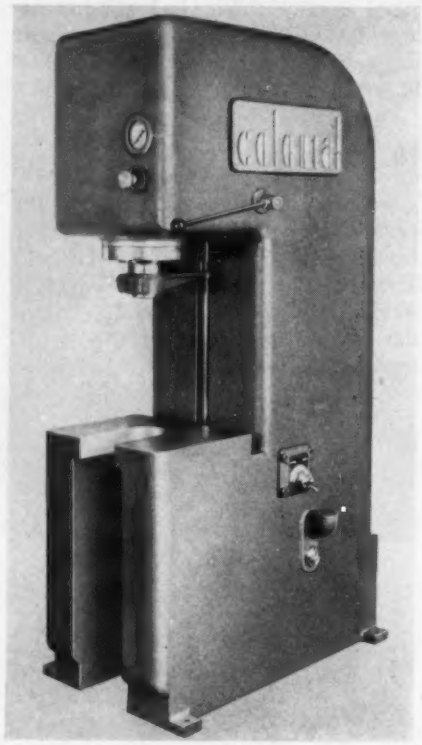

rubber vibration mounts reduces compressor vibration to a minimum.

Known as Air Chief industrials, the units are available in four types: Base compressors; stationary units with base ready for installation of customer's electrical equipment; departmental compressors powered by alternating current motors; and departmental compressors with direct current motors. Illustrated is the 210 cubic feet per minute model with 1800 revolutions per minute 220/440 volt alternating current motor.

## 24. Assembly Press

With a maximum adjustable stroke of 12 in., a power stroke speed of 180 ipm and a return stroke of twice that amount, the new 10 ton hydraulically operated assembly press, made by Colonial Broach Co., Box 37, Harper Station, Detroit 13, has ram speeds adjustable over a wide range and a working pressure of 1200 psi (maximum), also adjustable. Desired pressure may be selected and maintained through a direct reading pressure gage adjacent to pressure control lever.

Standard equipment includes hand operating control and pressure gage. Foot pedal control and various pressure and




speed controls are also available. Compact machine requires 25 x 42 in. of floor space and is operated by a 7½ hp motor.

## 25. Gage Vise

Changing setup and checking for many operations in precision grinding are eliminated with the gage vise manufactured by Erickson Steel Co., 2309 Hamilton avenue, Cleveland. Used in connection with a magnetic chuck for surface grinding, milling, drilling, jig boring, etc., the device is accurate to within 0.0003-in. A v-shaped jaw has been added to permit holding round stock. Accommodating sizes up to 2 ⅝-in., it may be used with sine plates.

## 26. Spectrochemical Unit

Applied Research Laboratories, 7707 Michigan avenue, Detroit 10, is manufacturing a new source unit for spectrochemical analysis which is designed for high quantitative precision and accuracy. The unit provides two basic spectrum sources—one of high voltage and frequency used for the higher percentage determinations and one of low voltage and frequency used for lower percentage analyses.

Completely separate charge and discharge cycles provide a very high degree of reproductibility. High voltage source utilizes 240 spark trains per second of short duration, while the low voltage source uses 60 arc discharges per second of long duration. A wide range of circuit constants may be furnished to provide optimum conditions for any type of sample to be analyzed.

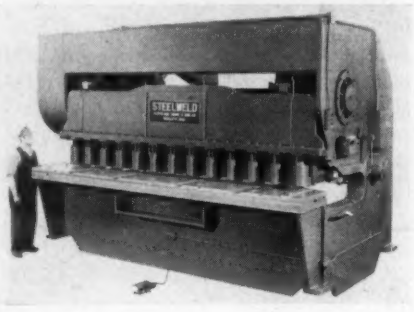
## 27. Self-Aligning Bearing

Consisting of only two pieces, the Halfco spherical self-aligning bearing, made by Adel Precision Products Corp., Burbank, Calif., is adaptable for use as a rod end bearing, rotation bearing, static and self-aligning bushing, etc.

Outer race is of hard bronze, integrally formed around a hardened, highly polished, precision ground steel ball. Bearings may be fabricated from a wide variety of metals to meet specific installation requirements. Design allows the greatest possible misalignment; full spherical surface contact permits extremely heavy loading and resists both axial and radial thrusts.

## 28. Pivoted Blade Shear

Capable of cutting 12 ft of 3/4-in. steel plate at 30 strokes per minute, the new pivoted blade shear, made by Cleveland Crane & Engineering Co.,




Wickliffe, O., has a extra deep 36-in. throat, permitting slitting of very wide plate. Knife clearance may be varied to suit thickness of plate being cut by turning a hand crank which changes gap between the knives.

Large dial indicator indicates clearance in thousandths of an inch and also shows plate thickness which may be cut for any knife setting. Machine is electrically operated by a foot switch which may be moved about floor to best working position. A plate type knife-guard safeguards against injury from both knives and holddowns. Ball bearing transfers mounted on top of bed are features which ease movement of heavy plate.

**FOR MORE INFORMATION**
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

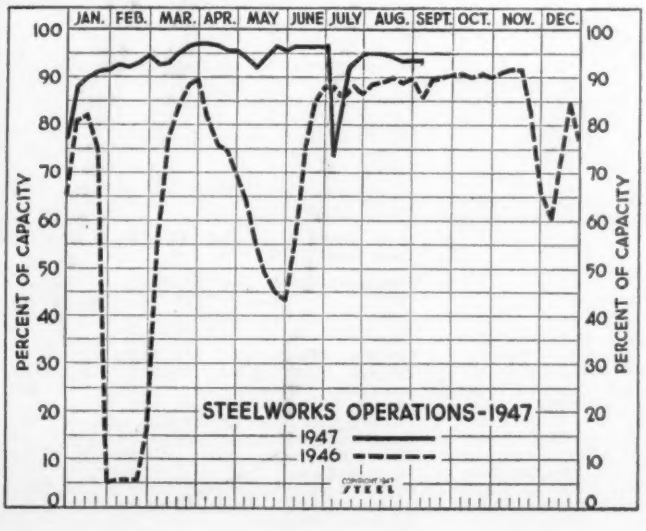
# Steel Markets Displaying Renewed Price Stability

***Inflationary forces still factor to be reckoned with but signs point to steadiness over remainder of year. Even scrap calms down after recent sharp downturn. Ferroalloy revisions only changes of importance over past week***

RELATIVE stability has been achieved in the iron and steel markets following a period of several months which was marked by a high degree of uncertainty with respect to prices. The general increase about Aug. 1, now fully in effect, appears to have removed most of this uncertainty, and while inflationary forces continue a factor to reckon with, the markets currently have calmed down and give promise of holding at about present levels, except for minor adjustments, for some time into the future.

Except for an increase in ferroalloy prices, effective immediately on spot business, and Oct. 1 on contracts, the markets last week were featureless pricewise. Even scrap prices, which have attracted widespread attention of late because of erratic up and down swings, apparently have steadied for the time being following an orderly retreat from a postwar peak early in August. Later in the year it is expected that higher prices will be announced on tin plate which up to now has remained unchanged because of long-term contracts. However, with this exception major revisions in the steel market appear to have been completed.

Biggest problem faced by the steel industry is that involved in matching output with demand. Despite the record peacetime production pace of recent months, consumers' needs continue as pressing as ever. Some hope had been held out for relief on this score through the bringing in of new mill facilities, but this hope largely has gone by the board with completion of most new mill installations delayed many months due to labor difficulties and shortages of materials. Further aggravating the situation is the fact considerable repair work to furnaces and mill equipment is necessary because of the wear and tear of uninterrupted operations over a long period of time. Considerable repair work is scheduled for this fall, repairs which cannot be delayed longer, especially the relining of blast furnaces.




**DISTRICT STEEL RATES**

Percentage of Ingot Capacity engaged in Leading Districts

| | Week Ended Sept. 6 | Change | Same Week 1946 | Same Week 1945 |
|---|---|---|---|---|
| Pittsburgh | 98.5 | + 1 | 98 | 65.5 |
| Chicago | 90.5 | None | 74.5 | 72 |
| Eastern Pa. | 92 | + 1 | 80 | 72 |
| Youngstown | 92 | None | 89 | 72 |
| Wheeling | 81.5 | — 7.5 | 81.5 | 95 |
| Cleveland | 91 | — 3.5 | 88 | 78.5 |
| Buffalo | 94 | + 5.5 | 90.5 | 72 |
| Birmingham | 99 | None | 99 | 95 |
| New England | 80 | — 9 | 84 | 80 |
| Cincinnati | 87 | None | 83 | 82 |
| St. Louis | 82 | None | 44.5 | 65 |
| Detroit | 92 | None | 91 | 89 |
| Estimated national rate | 93 | None | 85.5 | 73.5 |

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

Consumer requirements for virtually all the major products continue to tax production facilities to the limit. The situation is especially acute in sheets and strip, buyers of which are disappointed over the curtailed quotas set up for fourth quarter. Cutting down of quotas has been necessitated by the lag in current quarter shipments and the expected overflow of tonnage into fourth quarter. However, despite the quota cuts consumers actually stand to get more tonnage over the final three months of the year than in the current quarter since shipments on old contracts are likely to increase.

For the moment the scrap market appears becalmed. Some small lot tonnage business is going at the lower prices recently established. However, the bulk of scrap moving still is on old high priced contracts and expectations are present prices are likely to remain largely untested until these old contracts are out of the way. Basically, scrap is in a strong position. With steel operations promising to hold at a high level through the winter and into next spring, most observers anticipate continuance of a bullish market in this vital steelmaking material.

National steel ingot rate held unchanged last week at 93 per cent of capacity, gains in operations at certain points being offset by declines elsewhere. Increases were reported in three districts: Pittsburgh, up 1 point to 98.5 per cent; Buffalo, 5½ points to 94 per cent; and eastern Pennsylvania, 1 point to 92 per cent. Counteracting these gains were declines at three other steelmaking centers. Cleveland operations were down 3½ points to 91 per cent; Wheeling dropped 7½ points to 81.5 per cent; and New England was off 9 points to 80 per cent.

Last week STEEL's finished steel composite held unchanged at $75.41; that on semifinished steel at $56.80; and that on steelmaking scrap at $37.83. The steelmaking pig iron composite declined a few cents to $36.20 from $36.28 the week preceding.

# COMPOSITE MARKET AVERAGES

| | Sept. 6 | Aug. 30 | Aug. 23 | One Month Ago Aug., 1947 | Three Months Ago June, 1947 | One Year Ago Sept., 1946 | Five Years Ago Sept., 1942 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $75.41 | $75.41 | $75.41 | $75.41 | $69.82 | $64.45 | $56.73 |
| Semifinished Steel | 56.80 | 56.80 | 56.80 | 56.80 | 52.10 | 40.60 | 36.00 |
| Steelmaking Pig Iron | 36.20 | 36.28 | 35.56 | 36.06 | 32.49 | 27.50 | 23.00 |
| Steelmaking Scrap | 37.83 | 37.83 | 37.91 | 39.00 | 32.48 | 19.17 | 19.17 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

## Finished Materials

| | Sept. 6, 1947 | Aug, 1947 | June, 1947 | Sept., 1946 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.90c | 2.90c | 2.60c | 2.50c |
| Steel bars, Philadelphia | 3.28 | 3.28 | 2.98 | 2.86 |
| Steel bars, Chicago | 2.90 | 2.90 | 2.50 | 2.50 |
| Shapes, Pittsburgh | 2.80 | 2.80 | 2.50 | 2.35 |
| Shapes, Philadelphia | 2.94 | 2.94 | 2.64 | 2.48 |
| Shapes, Chicago | 2.80 | 2.80 | 2.50 | 2.35 |
| Plates, Pittsburgh | 2.95 | 2.95 | 2.65 | 2.50 |
| Plates, Philadelphia | 3.15 | 3.15 | 2.85 | 2.558 |
| Plates, Chicago | 2.95 | 2.95 | 2.65 | 2.50 |
| Sheets, hot-rolled, Pittsburgh | 2.80 | 2.80 | 2.50 | 2.425 |
| Sheets, cold-rolled, Pittsburgh | 3.55 | 3.55 | 3.20 | 3.275 |
| Sheets, No. 10 galv., Pittsburgh | 3.90 | 3.90 | 3.55 | †4.05 |
| Sheets, hot-rolled, Gary | 2.80 | 2.80 | 2.50 | 2.425 |
| Sheets, cold-rolled, Gary | 3.55 | 3.55 | 3.20 | 3.275 |
| Sheets, No. 10 galv., Gary | 3.90 | 3.90 | 3.55 | †4.05 |
| Strip, hot-rolled, Pittsburgh | 2.80 | 2.80 | 2.50 | 2.45 |
| Strip, cold-rolled, Pittsburgh | 3.55 | 3.55 | 3.20 | 3.05 |
| Bright basic, bess. wire, Pittsburgh | 3.675 | 3.675 | 3.425 | 3.05 |
| Wire nails, Pittsburgh | 4.25 | 4.25 | 4.125 | 3.75 |
| Tin plate, per base box, Pittsburgh | $5.75 | $5.75 | $5.75 | *$5.25 |

* Nominal. † Base, No. 24 gage.

## Semifinished Material

| | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago | $60.00 | $60.00 | $50.00 | $38.00 |
| Slabs, Pittsburgh, Chicago | 47.50 | 47.50 | 42.00 | 39.00 |
| Rerolling billets, Pittsburgh | 47.50 | 47.50 | 42.00 | 39.00 |
| Wire rod 7/32 to ¼-inch, Pitts. | 2.925c | 2.925c | 2.55c | ‡2.30c |

‡ Base, No. 5 to 5/16-in.

## Pig Iron

| | Sept. 6, 1947 | Aug, 1947 | June, 1947 | Sept., 1946 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $37.83 | $37.83 | $34.83 | $29.77 |
| Basic, Valley | 36.00 | 36.00 | 33.00 | 28.00 |
| Basic, eastern del. Philadelphia | 38.72 | 38.72 | 35.52 | 29.93 |
| No. 2 fdry., del. Pgh. N. & S. sides | 37.33 | 37.33 | 34.33 | 29.27 |
| No. 2 fdry., del. Philadelphia | 39.22 | 39.22 | 36.02 | 30.43 |
| No. 2 foundry, Chicago | 36.00 | 36.00 | 33.00 | 28.50 |
| No. 2 foundry, Valley | 36.50 | 36.50 | 33.50 | 28.50 |
| Southern No. 2, Birmingham | 34.88 | 34.51 | 29.88 | 24.88 |
| Southern No. 2, del. Cincinnati | 39.75 | 39.38 | 34.75 | 28.94 |
| Malleable, Valley | 36.50 | 36.50 | 33.50 | 28.50 |
| Malleable, Chicago | 36.50 | 36.50 | 33.50 | 28.50 |
| Charcoal, low phos., fob Lyles, Tenn. | 44.00 | 44.00 | 40.50 | 33.00 |
| Ferromanganese, fob cars, Pittsburgh | 140.25 | 140.25 | 140.25 | 140.00 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melt. steel, No. 1, Pittsburgh | $38.00 | $39.875 | $32.44 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 36.75 | 38.35 | 33.38 | 18.75 |
| Heavy melt. steel, No. 1, Chicago | 38.75 | 39.625 | 30.75 | 18.75 |
| Heavy melt. steel, No. 1, Valley | 39.00 | 40.50 | 34.06 | 21.00 |
| Heavy melt. steel, No. 1, Cleveland | 38.25 | 38.81 | 32.38 | 19.50 |
| Heavy melt. steel, No. 1, Buffalo | 37.50 | 40.88 | 32.00 | 19.25 |
| Rails for rerolling, Chicago | 46.25 | 47.125 | 38.75 | 22.25 |
| No. 1 cast, Chicago | 43.50 | 43.50 | 39.50 | 23.75 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, beehive furnace | $12.00 | $12.00 | $9.56 | $8.75 |
| Connellsville, beehive foundry | 14.50 | 14.50 | 10.75 | 9.50 |
| Chicago, oven foundry, del. | 18.50 | 18.50 | 16.10 | 15.10 |

# FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

## Semifinished Steel

**Carbon Steel Ingots:** Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

**Alloy Steel Ingots:** Pittsburgh, $56.

**Rerolling Billets, Blooms, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $45-$50, sales by smaller interests on negotiated basis at $65 or higher. Detroit, del., $53; eastern Mich., $54.

**Forging Quality, Billets, Blooms, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $55-$58; Detroit, del., $61; eastern Mich., $62.

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $60; sales by smaller interests on negotiated basis at $66 or higher.

**Skelp:** Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.60c-2.65c per lb.

**Tube Rounds:** Pittsburgh, Chicago, Gary, Cleveland, $69.

**Wire Rods:** Pittsburgh, Chicago, Birmingham, 7/32 to ½-in., inclusive $2.80-3.05 per 100 lb. Galveston base, $2.95. Worcester, 2.90c. San Francisco (base del.), $3.22.

## Bars

**Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.:** Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.31c; Phila., del., 3.28c; San Francisco (base, del), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.58c, base.

**Rail Steel Bars:** Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

**Hot-Rolled Alloy Bars:** Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del), 3.325c; Seattle, 3.88c, base.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base price upon application.

**Iron Bars:** Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

## Sheets

**Hot-Rolled Sheets (18 gage and heavier):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.00c; New York, del., 3.09c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent.

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 3.96c; Philadelphia, del., 3.93c.

**Galvanized Sheets, No. 10:** (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.85c-3.95c; Granite City, 4.05c; New York, del., 4.24c; Philadelphia, del., 4.15c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

**Corrugated Galvanized Sheets, No. 10:** (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

**Culvert Sheets, No. 16 flat:** (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c. Granite City base prices 10 points higher. Los Angeles (base, del.), 5.24c; San Francisco (base, del.) 5.245c.

**Aluminized Sheets:** Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

**Long Ternes, No. 10:** Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

**Enameling Sheets, No. 12:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.95c; Granite City, base, 4.05c; Detroit; del., 4.10c; eastern Mich., 4.15c.

**Electrical Sheets, No. 24:** Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

## Strip

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base del.), 3.605c; Los Angeles (base del.), 3.60c.

**Cold-Rolled Strip,** 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.00, 7.15c; over 1.00, 9.45c; add 0.20c for Worcester.

## Tin, Terne, Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

**Electrolytic Tin Plate:** Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

**Manufacturing Ternes (Special Coated):** Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, 3.10c; New York, del. 3.24c; Phila., del., 3.15c; St. Louis, del., 2.77c; Boston, del., 3.16c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 4.15c, basing points.)

**Floor Plates:** Pittsburgh, Chicago, 4.20c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

**Clad Steel Plates:** Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

## Shapes

**Structural Shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.00c; Phila., del., 2.94c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

**Alloy Structural Shapes:** Pittsburgh, Chicago, 3.55c.

**Steel Piling:** Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

## Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

**Wire to Manufacturers in carloads**

Bright, basic or bessemer.....*$3.55–3.80
Spring (except Birmingham)....**$4.25–**4.50

**Wire Products to Trade**

**Nails**

Standard and cement-coated ..... †$4.25
Galvanized ..... ‡$4.00
Staples, polished and galvanized..... $4.25

**Wire,** Merchant Quality

Annealed (6 to 8 base) ..... §$4.20
Galvanized (6 to 8 base) ..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)

**Woven fence,** 15 gage and heavier.... ††91
**Barbed wire,** 80-rod spool..... ††101
**Barbless wire,** twisted ..... 101
**Fence posts** (no clamps) ..... ††90
**Bale ties,** single loop..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del) $4.56 for bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

## Rails, Supplies

**Rails:** Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

**Supplies:** Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.00c-4.50c; screw spikes, 5.80c-6.40c. Axles, 4.10c.

## Tubular Goods

**Standard Steel Pipe:** Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

| | Butt Weld | | | | |
|---|---|---|---|---|---|
| In. | Blk. | Gal. | In. | Blk. | Gal. |
| ⅛ | 46 | 19½ | 1 | 56 | 41½ |
| ¼ | 47 | 25 | 1¼ | 56½ | 42 |
| ⅜ | 44 | 22 | 1½ | 57 | 42½ |
| ½ | 50½ | 34½ | 2 | 57½ | 43 |
| ¾ | 53½ | 38½ | 2½ & 3 | 58 | 43½ |

| | Lap Weld | | Elec. Weld | | Seamless | |
|---|---|---|---|---|---|---|
| In. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. |
| 2 | 49 | 34 | 48½ | 33½ | 48 | 33 |
| 2½-3 | 52 | 37 | 51½ | 36½ | 51 | 36 |
| 3½-6 | 54 | 39 | 53½ | 38½ | 53 | 38 |

**Line Steel Pipe:** Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

| In. | Butt Weld | In. | Butt Weld |
|---|---|---|---|
| ⅛ | 45 | 1 | 55 |
| ¼ | 46 | 1¼ | 55½ |
| ⅜ | 43 | 1½ | 56 |
| ½ | 49½ | 2 | 56½ |
| ¾ | 52½ | 2½ & 3 | 57 |

| In. | Lap Weld | Elec. Weld | Seamless |
|---|---|---|---|
| 2 | 48 | 47½ | 47 |
| 2½ & 3 | 51 | 50½ | 50 |
| 3½-6 | 53 | 52½ | 52 |
| 8 | 53½ | 53 | 52½ |
| 10 | 53 | 52½ | 52 |
| 12 | 52 | 51½ | 51 |

**Boiler Tubes:** Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

| | | —Seamless— | | —Elec. Weld— | |
|---|---|---|---|---|---|
| O.D. Sizes | B.W.G. | Hot Rolled | Cold Drawn | Hot Rolled | Cold Drawn |
| 1″ | 13 | .... | $11.87 | $11.51 | $11.51 |
| 1¼″ | 13 | .... | 14.06 | 11.48 | 13.64 |
| 1½″ | 13 | $13.08 | 15.69 | 12.69 | 15.22 |
| 1¾″ | 13 | 14.88 | 17.85 | 14.43 | 17.31 |
| 2″ | 13 | 16.67 | 19.99 | 16.17 | 19.39 |
| 2¼″ | 13 | 18.58 | 22.29 | 18.02 | 21.62 |
| 2¼″ | 12 | 20.47 | 24.54 | 19.86 | 23.80 |
| 2½″ | 12 | 22.42 | 26.87 | 21.75 | 26.06 |
| 2¾″ | 12 | 23.76 | 28.48 | 23.05 | 27.63 |
| 3″ | 12 | 24.93 | 29.90 | 24.18 | 29.00 |
| 3¼″ | 11 | 29.03 | 34.81 | 28.16 | 33.77 |
| 3½″ | 11 | 31.17 | 37.39 | 30.23 | 36.27 |
| 4″ | 10 | 38.69 | 46.38 | 37.53 | 44.99 |
| 4½″ | 9 | 51.28 | 61.50 | .... | .... |
| 5″ | 9 | 59.39 | 71.18 | .... | .... |
| 6″ | 7 | 91.13 | 109.27 | .... | .... |

**Pipe, Cast Iron:** Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $85.06, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B. Prices effective as of July 24, 1947.

## Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

**Carriage and Machine Bolts**

| | |
|---|---|
| ½-in. and smaller; up to 6 in. in length | 48 off |
| ⅝ and ¾ x 6-in. and shorter..... | 50 off |
| Larger diameter; longer than 6 in.... | 47 off |
| Tire bolts ..... | 38 off |
| Step bolts ..... | 46 off |
| Plow bolts ..... | 57 off |
| Lag bolts | |
| ¼ in. up to 1 in., 6 in. and shorter. | 50 off |
| ¼ in. up to 1 in., longer than 6 in.. | 48 off |

**Stove Bolts**

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

**Nuts**

| Semifinished hexagon | A.S. Light | A.S. Reg. and Heavy |
|---|---|---|
| ⅞-in. and smaller ..... | 51 off | .... |
| 1-in. and smaller ..... | .... | 50 off |
| 1⅛-in.-1-in. ..... | 48 off | .... |
| 1¼-in.-1-in. ..... | .... | 49 off |
| 1⅛-in.-1½-in. ..... | 46 off | 47 off |
| 1⅝-in. and larger ..... | .... | 40 off |

Additional discount of 15 for full containers.

**Hexagon Cap Screws**

| | |
|---|---|
| Upset 1-in. smaller (10-20 bright).... | 56 off |
| Upset (10-35 heat treated) | |
| ⅝ x 6 ..... | 51 off |
| ¾, ⅞, & 1 x 6 ..... | 47 off |

**Square Head Set Screws**

| | |
|---|---|
| Upset 1-in. and smaller..... | 61 off |
| Headless, ¼-in. and larger..... | 46 off |
| No. 10 and smaller ..... | 56 off |

## Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

| | |
|---|---|
| Structural ..... | 5.25c |
| Lebanon, Pa. ..... | 5.40c |
| ⅛-in. and under ..... | 55-5 off |
| Lebanon, Pa. .....55-5 off plus 15c per cwt. | |

## Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

## Tool Steels

**Tool Steel:** Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

| W | Cr | V | Mo | Base, Per lb |
|---|---|---|---|---|
| 18.00 | 4 | 1 | .... | 82.00c |
| 1.5 | 4 | 1 | 8.5 | 59.00c |
| 12 | 3 | 0.50 | .. | 67.00c |
| 6.40 | 4.15 | 1.90 | 5 | 63.00c |
| 5.50 | 4.50 | 4 | 4.50 | 80.00c |

## Stainless Steels

Base, Cents per lb

| Grade | Bars, Drawn Wire, Structurals | Plate | Sheets | Hot Rolled Strip | Cold Rolled Strip |
|---|---|---|---|---|---|
| **CHROMIUM NICKEL STEELS** | | | | | |
| 301.... | 26.00c | 29.50c | 37.00c | 22.00c | 28.00c |
| 302.... | 26.00 | 29.50 | 37.00 | 23.50 | 30.50 |
| 303.... | 28.50 | 31.50 | 39.00 | 29.50 | 36.00 |
| 304.... | 27.50 | 31.50 | 39.00 | 25.50 | 32.50 |
| 308.... | 31.50 | 37.00 | 44.50 | 31.00 | 38.00 |
| 309.... | 39.00 | 43.50 | 51.00 | 40.50 | 51.00 |
| 310.... | 53.50 | 56.50 | 57.50 | 53.00 | 61.00 |
| 316.... | 43.50 | 48.00 | 52.00 | 43.50 | 52.00 |
| 321.... | 31.50 | 37.00 | 44.50 | 32.00 | 41.50 |
| 347.... | 36.00 | 41.50 | 49.00 | 36.00 | 45.50 |
| 431.... | 21.00 | 24.00 | 31.50 | 19.00 | 24.50 |
| 440A.. | 26.00 | 31.00 | 36.50 | 26.00 | 30.50 |
| **STRAIGHT CHROMIUM STEEL** | | | | | |
| 403.... | 23.50 | 27.00 | 32.00 | 23.00 | 29.50 |
| 410.... | 20.50 | 23.50 | 29.00 | 18.50 | 24.00 |
| 416.... | 21.00 | 24.00 | 29.50 | 20.00 | 25.50 |
| 420.... | 26.00 | 31.00 | 36.50 | 26.00 | 39.50 |
| 430.... | 21.00 | 24.00 | 31.50 | 19.00 | 24.50 |
| 430F.. | 21.50 | 24.50 | 32.00 | 20.50 | 27.00 |
| 442.... | 24.50 | 28.00 | 35.50 | 26.00 | 35.00 |
| 443.... | 24.50 | 28.00 | 35.50 | 26.00 | 35.00 |
| 446 ... | 30.00 | 33.00 | 39.50 | 38.00 | 56.50 |
| *501... | 9.00 | 13.00 | 17.50 | 13.00 | 18.50 |
| *502... | 10.00 | 14.50 | 18.50 | 14.50 | 19.50 |
| **†STAINLESS CLAD STEEL (20%)** | | | | | |
| 304.... | .... | 24.00 | 22.00 | .... | .... |
| 410.... | .... | 22.00 | 20.00 | .... | .... |
| 430.... | .... | 22.50 | 20.50 | .... | .... |
| 446.... | .... | 29.00 | 27.00 | .... | .... |

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

# RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

## PIG IRON

| Per Gross Ton | No. 2 Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $37.50 | $37.00 | $38.50 | $38.00 |
| Newark, N. J., del. | 39.34 | 38.84 | 40.34 | 39.84 |
| Brooklyn, N. Y., del. | 40.50 | .... | .... | 41.00 |
| Philadelphia, del. | 39.22 | 38.72 | 40.22 | 39.72 |
| **Birdsboro, Pa., base** | 40.50 | 40.00 | 41.50 | 41.00 |
| **Birmingham,** base | 33.38* | 32.88* | .... | .... |
| Baltimore, del. | 39.78 | .... | .... | .... |
| Chicago, del. | 37.12 | .... | .... | .... |
| Cincinnati, del. | 38.25 | .... | 37.75 | .... |
| Newark, N. J., del. | 39.46 | .... | .... | .... |
| Philadelphia, del. | 38.84 | .... | .... | .... |
| St. Louis, del. | 37.37 | .... | 36.87 | .... |
| **Buffalo,** base | *36.00 | *35.50 | 37.00 | *36.50 |
| Boston, del. | 42.48 | 41.98 | 43.48 | 42.98 |
| Rochester, del. | 37.84 | 37.34 | 38.84 | 38.34 |
| Syracuse, del. | 38.50 | 38.00 | 39.50 | 39.00 |
| **Canton, Massillon, O.,** base | 36.00 | 35.50 | .... | 36.50 |
| **Chicago,** base | 36.00 | 35.50 | 37.00 | 36.50 |
| Milwaukee, del. | 37.32 | 96.82 | 38.32 | 37.83 |
| Muskegon, Mich., del. | 39.83 | .... | .... | 40.33 |
| **Cleveland,** fob furnace | *36.00 | *35.50 | 37.00 | *36.50 |
| Akron, del. | 37.67 | 37.17 | 38.67 | 38.17 |
| **Duluth,** base | 36.50 | 36.00 | 37.50 | 37.00 |
| **Erie, Pa.,** base | 36.00 | 35.50 | 37.00 | 36.50 |
| **Everett, Mass.,** base | 45.00 | .... | .... | 45.50 |
| **Granite City, Ill.,** base | 37.00 | 36.50 | .... | 37.00 |
| St. Louis, del. | 37.75 | 37.25 | .... | 37.75 |
| †**Neville Island, Pa.,** base | 36.50 | 36.00 | 37.00 | 36.50 |
| Pittsburgh, del., N. & S. Sides | 37.33 | 36.83 | 37.83 | 37.33 |
| **Provo, Utah,** base | 37.50 | 37.00 | .... | .... |
| Seattle, Tacoma, Wash., del. | 41.60 | .... | .... | .... |
| Portland, Oreg., del. | 41.60 | .... | .... | .... |
| **Sharpsville, Pa.,** base | 36.50 | 36.00 | 37.00 | 36.50 |
| **Steelton, Pa.,** base | 37.50 | 37.00 | 38.50 | 38.00 |
| **Struthers, O.,** base | 37.00 | 36.50 | 37.50 | 37.00 |
| **Swedeland, Pa.,** base | 41.50 | 41.00 | 42.50 | 42.00 |
| **Troy, N. Y.,** base | 38.00 | 37.50 | 39.00 | 38.50 |
| **Toledo, O.,** base | 36.00 | 35.50 | 37.00 | 36.50 |
| Cincinnati, del. | 39.50 | 39.00 | .... | .... |
| **Youngstown, O.,** base | 36.50 | 36.00 | 37.00 | 36.50 |
| Mansfield, O., del. | 39.48 | 38.98 | 39.98 | 39.48 |

† To Neville Island base add: 66c for McKees Rocks, Pa., $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

* Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Aug. 13; $3.75 higher at Buffalo and $2.75 higher at Cleveland, effective on shipments during week ended Sept. 6.

### Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base) ....$45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

### Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

**Electric Furnace Silvery Pig Iron:** Si 14.01-14.50%, $66.75, Jackson, O.; $70, Niagara Falls; $74, piglets, $72, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

### Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$44.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

### Gray Forge

Neville Island, Pa. .....$36.00

### Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00; Birdsboro, Pa., $45 base; Philadelphia, $44.22, del. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

### Differentials

Basing point prices are subject to following differentials:

**Silicon:** An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

**Phosphorus:** A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

**Manganese:** An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

**Nickel:** An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

## Metallurgical Coke

Price Per Net Ton

### Beehive Ovens

| | |
|---|---|
| Connellsville, furnace | $11.50-$12.50 |
| Connellsville, foundry | 14.00- 15.00 |
| New River, foundry | 12.50 |
| Wise county, foundry | 11.15 |
| Wise county, furnace | 10.65 |

### Oven Foundry Coke

| | |
|---|---|
| Kearney, N. J., ovens | $17.85 |
| Chicago, outside del. | 17.50 |
| Chicago, del. | 18.50 |
| Terre Haute, del. | 18.05 |
| Milwaukee, ovens | 18.25 |
| New England, del. | 19.50 |
| Birmingham, del. | 15.00 |
| Indianapolis, ovens | 17.00 |
| Cincinnati, del. | 16.50 |
| Ironton, O., ovens | 15.50 |
| Painesville, ovens | 16.60 |
| Cleveland, del. | 17.90 |
| Buffalo, del. | 18.25 |
| Detroit, del. | 17.65 |
| Philadelphia, ovens | 16.75 |
| Swedeland, Pa., ovens | 16.75 |
| Portsmouth, O., ovens | 16.00 |
| Fairmont, W. Va., ovens | 15.75 |
| Pittsburgh, del. | 17.61 |

## Coal Chemicals

Spot, gal. freight allowed east of Omaha. Effective as of Apr. 1, 1947.

| | |
|---|---|
| Pure and 90% benzol | 19.00c |
| Toluol, two degrees | 23.00c |
| Industrial xylol | 23.00c |
| Solvent naphtha | 26.00c |

Per pound fob works

| | |
|---|---|
| Phenol (car lots, returnable drums) | 11.25c |
| Do., less than carlots | 12.00c |
| Do., tank cars | 10.25c |

Eastern plants, per pound

| | |
|---|---|
| Naphthalene flakes, balls, bbl, to jobbers, "house-hold use" | 9.50c |

Per ton, bulk, fob plants

| | |
|---|---|
| Sulphate of ammonia | $30.00 |

## Refractories

Per 1000, fob shipping point Net Prices

### Fire Clay Brick

Super Duty

| | |
|---|---|
| Pa., Mo., Ky. | $87.00 |

High Heat Duty

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 70.00 |
| Ala., Ga. | 70.00 |
| N. J. | 75.00 |

Intermediate Heat Duty

| | |
|---|---|
| Ohio | 64.00 |
| Pa., Ill., Md., Mo., Ky. | 64.00 |
| Ala., Ga. | 56.00 |
| N. J. | 67.00 |

Low Heat Duty

| | |
|---|---|
| Pa., Md., Ohio | 56.00 |

### Ladle Brick

(Pa., O., Va., Mo.)

| | |
|---|---|
| Dry Press | 47.00 |
| Wire Cut | 45.00 |

### Malleable Bung Brick

| | |
|---|---|
| All bases | 80.00 |

### Silica Brick

| | |
|---|---|
| Pennsylvania | 70.00 |
| Joliet, E. Chicago | 79.00 |
| Birmingham, Ala. | 70.00 |

### Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

| | |
|---|---|
| Chrome brick | 59.00 |
| Chem. bonded chrome | 59.00 |
| Magnesite brick | 81.00 |
| Chem. bonded magnesite | 70.00 |

### Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

| | |
|---|---|
| Bulk | 24.00 |
| Single bags | 28.00 |

### Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $10.55; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, Mo.), add $0.20.

## Ores

### Lake Superior Iron Ore

*Gross ton, 51½% (Natural) Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $5.95 |
| Old range nonbessemer | 5.80 |
| Mesabi bessemer | 5.70 |
| Mesabi nonbessemer | 5.55 |
| High phosphorus | 5.55 |

### Eastern Local Ore

*Cents, units, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63% contract | 15.25 |

### Foreign Ore

*Cents per unit, cif Atlantic ports*

| | |
|---|---|
| No. African low phos. | Nom. |
| Swedish basic, 60 to 68% | 13.50 |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 68-69% fob Rio de Janeiro, nom. | 5.50–6.50 |

### Tungsten Ore

| | |
|---|---|
| Wolframite and scheelite per short ton unit, duty paid | $32–$34 |

### Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

### Chrome Ore

*Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.*

*(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)*

| | |
|---|---|
| Indian and African | |
| 48% 2.8:1 | $37.50 |
| 48% 3:1 | 39.00 |
| 48% no ratio | 31.00 |
| South African (Transvaal) | |
| 44% no ratio | $27-$27.50 |
| 45% no ratio | 28.00 |
| 48% no ratio | 30.00 |
| 50% no ratio | 31.00 |
| Brazilian—nominal | |
| 44% 2.5:1 lump | $33.65 |
| 48% 3:1 lump | 43.50 |
| Rhodesian | |
| 45% no ratio | $27-$27.50 |
| 48% no ratio | 30.00 |
| 48% 3:1 lump | 39.00 |
| Domestic (seller's nearest rail) | |
| 48% 3:1 | $39.00 |

### Molybdenum

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective $CaF_2$ content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

## HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

| | Pittsburgh | Chicago | Gary | Youngstown | Sparrows Point | Buffalo | Bethlehem | Canton | Massillon |
|---|---|---|---|---|---|---|---|---|---|
| Sheets, Hot-Rolled | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | ... | ... | ... |
| Cold-Rolled | 5.30 | 5.30 | 5.30 | 5.30 | ... | 5.30 | ... | ... | ... |
| Galvanized | 5.85 | ... | ... | ... | ... | ... | ... | ... | ... |
| Strip, Hot-Rolled | 4.30 | 4.30 | 4.30 | 4.30 | ... | ... | ... | ... | ... |
| Cold-Rolled | 5.30 | 5.30* | 5.30* | 5.30 | ... | ... | ... | ... | ... |
| Shapes Structural | 4.30 | 4.30 | ... | 4.30 | ... | ... | 4.30 | ... | ... |
| Plates | 4.55 | 4.55 | 4.55 | ... | 4.55 | ... | ... | ... | ... |
| Bars, Small Shapes | 4.45 | 4.45 | 4.45 | 4.45 | ... | 4.45 | ... | 4.45 | 4.45 |

*Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

# WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

| | SHEETS | | | | | STRIP | | BARS | | | | PLATES | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H-R 10G | C-R 10G | C-R 17G | Gal. •10G | Gal. •24G | ‡H-R | ‡C-R | H-R Rds. ⅝" to 3" | C-F Rds. ½"& up | H-R Alloy (§4140) | Structural Shapes | Carbon ⅜"-¾" | Floor ⅜" & Thicker |
| Boston (city) | 4.90 | 5.97[4] | 5.67[4] | 6.10[4] | 7.35[4] | 4.97 | 6.71 | 4.92 | 5.57 | 7.17 | 4.77 | 5.05 | 6.72 |
| ††New York (city) | 4.87 | 6.07 | 5.77[3] | 6.07 | 7.32 | 4.97 | .... | 4.97 | 5.52 | 6.97[9] | 4.72 | 5.02 | 6.70 |
| New York (country) | 4.72 | 5.92 | 5.62[3] | 5.92 | 7.17 | 4.82 | .... | 4.82 | .... | .... | 4.57 | 4.87 | 6.55 |
| Philadelphia (city) | 4.64 | 6.23[9] | 5.83[9] | 5.84 | 7.09 | 4.73 | 5.63 | 4.78 | 5.48 | 6.92[9] | 4.52 | 4.79 | 6.13 |
| Philadelphia (country) | 4.54 | 6.13[9] | 5.73[9] | .... | .... | 4.63 | 5.53 | 4.68 | .... | 6.82[9] | 4.42 | 4.69 | 6.03 |
| Baltimore (city) | 4.29† | 5.85[8]† | 5.55[8]† | 5.54 | 6.79 | 4.70 | .... | 4.75 | 5.45 | ..... | 4.64 | 4.74 | 6.20 |
| Baltimore (country) | 4.19† | 5.75[8]† | 5.45[8]† | 5.35 | 6.60 | 4.60 | .... | 4.65 | .... | .... | 4.54 | 4.64 | 6.10 |
| Washington (city) | 4.75 | .... | .... | .... | .... | 4.95 | .... | 5.00 | 5.60[12] | .... | 4.90 | 4.95 | 6.60 |
| Washington (country) | 4.65 | .... | .... | .... | .... | 4.85 | .... | 4.90 | .... | .... | 4.80 | 4.85 | 6.50 |
| Norfolk, Va. | 4.75 | .... | .... | .... | .... | .... | .... | 5.05 | 5.85 | .... | 5.00 | 5.00 | 6.75 |
| Memphis, Tenn. (city) | 4.82§§ | .... | 5.88 | 6.37 | .... | 5.02 | .... | 4.97 | 5.98 | .... | 4.97 | 5.17 | 6.88 |
| Memphis, Tenn. (country) | 4.72§§ | .... | 5.78 | 6.27 | .... | 4.92 | .... | 4.87 | 5.88 | .... | 4.87 | 5.07 | 6.78 |
| Buffalo (city) | 4.45 | .... | 5.20[6] | 5.90 | .... | 4.60 | 5.60 | 4.40 | 5.10 | 8.15 | 4.40 | 4.85 | 6.20 |
| Buffalo (country) | 4.30 | .... | 5.05[6] | 5.75 | .... | 4.45 | 5.45 | 4.25 | 4.95 | 8.00 | 4.25 | 4.70 | 6.05 |
| Pittsburgh (city) | 4.40§§ | .... | 5.25[8]† | 5.65 | 6.90 | 4.50 | 5.50 | 4.55 | 5.25 | 7.05 | 4.55 | 4.75 | 6.10 |
| Pittsburgh (country) | 4.25§§ | .... | 5.10[3]† | 5.50 | 6.75 | 4.35 | 5.35 | 4.40 | 5.10 | 6.90 | 4.40 | 4.60 | 5.95 |
| Cleveland (city) | 4.45 | 5.50[8] | 5.20[8] | 5.638 | 6.888 | 4.488 | 5.35 | 4.40 | 5.10 | 6.908 | 4.611 | 4.55 | 6.111 |
| Cleveland (country) | 4.30 | 5.35[8] | 5.05[8] | .... | .... | .... | 5.20 | 4.25 | 4.95 | .... | .... | 4.40 | .... |
| Cincinnati (city) | 4.671 | 5.516[8] | .... | 5.716 | 6.466 | 4.694 | .... | 4.703 | 5.353 | .... | 4.744 | 4.903 | 6.244 |
| Chicago (city) | 4.45 | 5.50[8] | 5.20[8] | 5.65 | 6.90 | 4.35 | 5.35 | 4.40 | 5.10 | 6.65[12] | 4.40 | 4.60 | 6.05 |
| Chicago (country) | 4.30 | 5.35[8] | 5.05[8] | 5.50 | 6.75 | 4.20 | 5.20 | 4.25 | 4.95 | 6.65[12] | 4.25 | 4.45 | 5.90 |
| Milwaukee | 4.599 | 5.649[8] | 5.349[8] | 5.799 | 7.049 | 4.499 | 5.599 | 4.549 | 5.249 | 6.949[9] | 4.549 | 4.749 | 6.199 |
| St. Louis | 4.749 | 5.799[9] | 5.499[8] | 5.974 | 7.224 | 4.649 | 5.774 | 4.699 | 5.424[12] | 7.124 | 4.699 | 4.899 | 6.349 |
| Birmingham (city) | 4.45[20]§§ | .... | .... | 5.80 | .... | 4.45[20] | .... | 4.40[20] | 5.93[22] | .... | 4.40 | 4.65 | 6.86 |
| Birmingham (country) | 4.30[20]§§ | .... | .... | 5.50 | .... | 4.30[20] | .... | 4.25[20] | .... | .... | 4.25 | 4.50 | .... |
| New Orleans | 4.98[20]•• | .... | 6.29[18] | .... | .... | 5.18[20] | .... | 5.13[20]•• | 6.29[11] | .... | 5.03[20]•• | 5.33[20] | 7.29[20] |
| Omaha, Nebr. | 5.068 | .... | .... | 6.468 | 7.718 | 5.168 | .... | 5.218 | 5.918 | .... | 5.218 | 5.418 | 6.868 |
| Seattle, Tacoma, Wash. | 5.30[17] | .... | 7.10[8] | 6.70 | .... | 5.60[17] | .... | 5.30[17] | 7.45[10] | 8.50[13] | 5.25[17] | 5.45 | 7.55[17] |

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [3]—any quantity; [4]—300 to 1999 lb; [5]—150 to 2249 lb; [6]—three to 24 bundles; [8]—450 to 1499 lb; [9]—one bundle to 1499 lb; [7]—one to nine bundles; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [10]—450 to 39,999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—400 to 14,999 lb; [14]—400 to 39,999; [18]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except Indianapolis, Los Angeles, San Francisco where price represents annealed bars; •• add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

# PRICES OF LEADING FERROALLOYS PRODUCTS

**Spiegeleisen:** 19-21% Mn, 1-3% Si, carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

**Ferromanganese, standard:** 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $15 for ton, $22 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

**Ferromanganese, low carbon:** Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

**Ferromanganese Briquets:** (Weight approx. 3 lb and containing exactly 2 lb Mn). Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

**Ferrotungsten:** Spot, 10,000 lb or more, per lb contained W, $2.32; contract, $2.50; freight allowed as far west as St. Louis.

**Ferrotitanium:** 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

**Ferrotitanium:** 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

**Ferrotitanium, High - Carbon:** 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

**Ferrovanadium:** V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Ferromolybdenum:** 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Ferrophosphorus:** 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrosilicon:** Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si.

**Ferroboron:** (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

**Ferrocolumbium:** 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

**Ferrochrome:** Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; western zone, add 0.5c for bulk, c.l.; and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

**Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

**Ferrochrome, Special Foundry:** (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

**S. M. Ferrochrome, high carbon:** (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium.

**S. M. Ferrochrome, low carbon:** (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western.

**Ferrochrome Briquets:** Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets, spot Prices per pound of briquets, notched 0.25c higher.

**Chromium Metal:** 97% min. Cr, max, 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

**Chromium-Copper:** (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

**Calcium metal; cast:** Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

**Calcium-Manganese-Silicon:** (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

**Calcium - Silicon:** (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

**Silicon Metal:** Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; cencral, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

**Silicomanganese Briquets:** Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

**Silicon Briquets:** Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed. Deduct 0.50c for bulk carlots.

**Manganese Metal:** (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

**Electrolytic Manganese:** 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

**Manganese-Boron:** (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

**Nickel-Boron:** (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

**Borosil:** 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

**Bortam:** B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

**Carbortam:** B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

**Silicaz Alloy:** (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

**SMZ Alloy:** (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western.

**CMSZ Alloys 4 & 5:** (Alloy 4—Cr 45-59%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

**Zirconium alloy:** 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c.

**Zirconium alloy:** Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c.

**Alsifer:** (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb carlots 6.50c; ton lots packed, 7.00c; 200 to 1999 lb, 7.75c; smaller lots, 8.25c. Spot up ½c.

**Simanal:** (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

**Tungsten Metal Powder:** Spot, not less than 98.8%, $3.05, freight allowed as far west as St. Louis.

**Grainal:** Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

**Vanadium Pentoxide,** technical grade: Fused, approx. 89-92% $V_2O_5$ and 5.84% $Na_2O$; or air dried, 83-85% $V_2O_5$ and 5.15% $Na_2O$, $1.10 per lb contained $V_2O_5$ fob plant freight allowed on quantities of 25 lb and over to St. Louis.

# Major Nonferrous Metals' Prices Hold Steady

*Joplin smelter boosts buying prices for zinc concentrates $8 a ton . . . Brass ingots are quoted ½ to 1 cent lower*

**NEW YORK** — Major nonferrous metals prices remained firm last week and activity for the most part was dull. Price revisions on zinc concentrates and brass ingots by two important interests held the attention of the trade.

**COPPER**—Lower prices of ½-cent to 1 cent a pound on various grades of brass ingots were announced by a prominent interest, which gave as the reason for the reduction the easier scrap supply situation. The lower prices now quoted by this interest wipe out the advances which were made effective July 28. Under this producer's new prices, the 85-5-5-5 group is quoted 1 cent lower as are ingot numbers 305 and 315; also 1 cent under the rest of the trade's prices are ingot numbers 210, 215, and 245 in the 88-10-2 group. Yellow brass ingot number 405 and manganese bronze ingot number 421 are 3/4-cent lower, while in the 80-10-10 group ingot number 325 is 1/2-cent lower.

Meanwhile in another segment of the trade, Scovill Mfg. Co., Waterbury, Conn., has furloughed for an indefinite period about 300 employees, because of a prolonged period in which orders have been below normal. Most of those laid off had been working in the casting shop.

Prices for electrolytic copper held unchanged on the basis of 21.50c, delivered Connecticut Valley.

**ZINC** — Giving as its reasons for raising its purchase price for 60 per cent zinc concentrates $8 a ton on material shipped to its Central mill, Eagle-Picher Mining & Smelting Co., Joplin, Mo., said this higher price would not only help the small independent marginal producer to continue operations but would help the large mill maintain its concentration efficiency by stepping up the flow of material to it. The action, which was effective Sept. 1, raised Eagle-Picher's price to $72 per ton, as against the open market in the Tri-State area of $64. Although previous to this action many operators had refused to sell at the lower price since the Premium Price bill was vetoed by President Truman early last month, American Zinc, Lead & Smelting Co. was able to purchase 2620 tons of zinc concentrates in the open market at the $64 price recently.

Production of zinc concentrates in the Tri-State district in the latest week was estimated at 2163 tons, compared with 2045 for the previous week. Shipments were also up, registering a gain of 918 tons to bring them to 2513 for the week. Stocks declined 350 tons, to bring the district's total on hand at the end of the week to 4400 tons.

Prime western zinc held steady at the 10.50 cents a pound price quoted at East St. Louis.

**LEAD** — Imports of refined lead by the United States totaled 91,361 tons for the first seven months of the year. This cumulative figure compares with 47,590 tons which were imported in the like period of 1946. Of the tonnage imported this year, 46,143 tons were from Mexico and 35,356 tons from Canada.

July imports amounted to 10,398 tons, an increase of 903 tons from the 9495 tons imported in June. Of the July's imports 3848 tons were from Canada and 3211 from Mexico.

No new developments have been reported in the trade, sales showing only moderate improvement, and the supplies of lead available through September have been almost entirely disposed of. One important seller officially opened his October books last Tuesday.

Prices were unchanged last week on the basis of 14.80 to 14.85c, St. Louis, for the common grade.

**TIN**—Negotiations for purchase of further tonnages of Straits tin are reportedly under way by Reconstruction Finance Corp., Washington. The government agency's purchases, last reported by it on Aug. 12, at that time amounted to 8450 tons of Straits metal, of which 5400 tons were first half allocations and 3050 tons for the second half. Several hundred tons of Chinese tin, understood to be of grade E quality and on its way to this country, is reported to be the subject of other RFC negotiations.

A plea for a free world market for tin was raised recently by Ernest V. Pearce, chairman and managing director, Consolidated Tin Smelters Ltd., London, when he said that only until this free market, to operate on the London Metal Exchange, is restored, "producers the world over will remain dissatisfied and lacking in that incentive to production which a free market would provide."

Prices for Straits tin were unchanged last week at 80.00c, New York, and the grade E Chinese tin being considered by RFC was quoted at 78.90c.

**SILVER**—The Mexican government last week placed the initial orders for September shipment of 2 million ounces of silver, all to be produced in that country and representing about half of that country's current rate of output. These purchases of the metal, which is to be used for coinage, will bring Mexico's silver purchases for July, August and September up to 6 million ounces. Price of foreign silver is currently at 70 cents, the same levels as prevailed last week, although in the interim this price had declined a cent an ounce. American silverware makers who re-entered the market two weeks ago are increasing their demands for silver and supplies are described as "fair."

**PLATINUM**—Price of platinum in the domestic market was advanced last week $3 an ounce by a leading refiner. This puts the domestic price at $69 for retail and $66 for wholesale. The prices of $66, retail, and $63, wholesale, had been established only last week after an important producer raised prices $10 an ounce over the prices which had been in effect since June 23. Reason for the higher prices, the trade says, is the increased seasonal demand from the jewelry trade preparing for Christmas buying. There is also reported a temporary shortage, resulting in part from lack of Russian offerings of the metal.

# NONFERROUS METAL PRICES

**Copper:** Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

**Brass Ingot:** 85-5-5-5 (No. 115) 18.00-19.00c; 88-10-2 (No. 215) 26.25-27.25c; 80-10-10 (No. 305) 22.00-23.00c; No. 1 yellow (No. 405) 14.50-15.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

**Zinc:** Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

**Lead:** Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

**Secondary Aluminum:** Piston alloy (No. 122 type) 14.00-14.50c; No. 12 foundry alloy (No. 2 grade) 13.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.75c; grade 3 (90-92%) 12.00-12.25c; grade 4 (85-90%) 11.50-11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl, 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl, 78.90c: Grade F, below 99% (for tin content), 78.70c.

**Antimony:** American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

**Nickel:** Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

**Mercury:** Open market, spot, New York, $84-$87 per 76-lb flask.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be, $17 per lb contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb. del.; anodes, balls, discs and all other special or patented shapes, $1.80.

**Cobalt:** 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 1000 lb (case); $1.72 lb under 100 lb.

**Gold:** U. S. Treasury, $35 per ounce.

**Indium:** 99.9%, $2.25 per troy ounce.

**Silver:** Open market, N. Y., 70.00c, per ounce.

**Platinum:** $66-$69 per ounce.

**Palladium:** $24 per troy ounce.

**Iridium:** $80-$90 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

**Sheet:** Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

**Rods:** Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

**Seamless Tubing:** Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

**Wire:** Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

**Copper Wire:** Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

**Aluminum Sheets and Circles:** 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

| B. & S. Gage | Max. Width or Diam. | Sheet Base | Circle Base |
|---|---|---|---|
| 0.0249"-7 | 48" | 23.70 | 26.20 |
| 8-10 | 48" | 24.20 | 26.70 |
| 11-12 | 26" | 24.70 | 27.50 |
| 13-14 | 26" | 24.90 | 27.90 |
| 15-16 | 26" | 25.10 | 28.20 |
| 17-18 | 26" | 25.40 | 28.60 |
| 19-20 | 24" | 25.70 | 29.00 |
| 21-22 | 24" | 26.10 | 29.50 |
| 23-24 | 24" | 26.60 | 30.20 |
| 25 | 24" | 27.10 | 30.90 |
| 26 | 24" | 27.80 | 31.90 |
| 27 | 24" | 28.50 | 33.00 |
| 28 | 24" | 29.20 | 33.70 |
| 29 | 24" | 30.00 | 34.70 |
| 30 | 24" | 30.80 | 35.80 |

**Lead Products:** Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

**Zinc Products:** Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

## Plating Materials

**Chromic Acid:** 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

**Copper Anodes:** Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

**Copper Carbonate:** 52-54% metallic Cu, 50 lb bags, 26.50c.

**Copper Cyanide:** 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

**Sodium Cyanide:** 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

**Nickel Anodes:** Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c, add 1 cent for rolled depolarized.

**Nickel Chloride:** 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

**Tin Anodes:** Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

**Tin Chloride:** Fob Grasselli, N. J., 625 lb bbl, price on application.

**Sodium Stannate:** To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

**Zinc Cyanide:** 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

## Scrap Metal

### BRASS MILL ALLOWANCE

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 19.125 | 19.125 | 18.375 |
| Yellow brass | 15.125 | 14.875 | 14.250 |
| Commercial Bronze | | | |
| 95% | 18.000 | 17.750 | 17.250 |
| 90% | 17.500 | 17.250 | 16.750 |
| Red brass | | | |
| 85% | 17.250 | 17.000 | 16.500 |
| 80% | 16.875 | 16.625 | 16.125 |
| Best Quality (71-79%) | 16.125 | 15.875 | 15.375 |
| Muntz Metal | 14.125 | 13.875 | 13.375 |
| Nickel silver, 5% | 16.125 | 15.875 | 8.063 |
| Phos. bronze, A, B | 20.000 | 19.750 | 18.750 |
| Naval brass | 14.500 | 14.250 | 13.750 |
| Manganese bronze | 14.500 | 14.250 | 13.625 |

### BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 13.50-14.00, auto radiators 10.25-10.50, heavy yellow brass 9.50-10.00, brass pipe 10.00-10.50.

### REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.25-18.50, No. 2 copper, 17.25-17.50, light copper, 16.25-16.50, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 14.00.

### DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

**Copper and Brass:** Heavy copper and wire No. 1 16.00-16.50, No. 2 15.00, light copper 14.00; No. 1 composition red brass 12.00-12.25, No. 1 composition turnings 11.50-11.75, mixed brass turnings 7.00, new brass clippings nom. 10.50, No. 1 brass rod turnings 9.50-10.00, light brass 6.00, heavy yellow brass 7.00, new brass rod ends 10.00-10.50, auto radiators, unsweated 9.00c, cocks and faucets 8.00-8.50, brass pipe 8.00-8.50.

**Lead:** Heavy 10.50-11.00, battery plates 6.50-7.00, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 10.75-11.00, solder joints 15.50-16.00.

**Zinc:** Old zinc 5.00-5.25, new die cast scrap 3.25-3.50, old die cast scrap 2.50.

**Tin:** No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

**Aluminum:** Clippings, 2S, 7.50-8.00, old sheets 6.00, crankcases 6.00, borings and turnings 2.00, pistons, free of struts, 5.00.

**Nickel:** Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

**Monel:** Clippings 12.00-12.50, turnings 7.00-7.25, old sheet 10.00-10.50, rods 10.00-10.50, castings 9.00.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

**Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.**

### PITTSBURGH

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $38.00 |
| No. 2 Heavy Melt. Steel | 38.00 |
| No. 1 Busheling | 38.00 |
| Nos. 1, 2 and 3 Bundles | 38.00 |
| Machine Shop Turnings | 32.50-33.00 |
| Mixed Borings, Turnings | 32.50-33.00 |
| Short Shovel Turnings. | 33.50-34.00 |
| Cast Iron Borings | 33.00-33.50 |
| Bar Crops and Plate | 45.50-46.50 |
| Low Phos. Steel | 45.50-46.50 |
| Punchings & Plate Scrap | 46.50-47.50 |
| Cut Structurals | 44.50-45.50 |
| Elec. Furnace Bundles. | 43.50-44.50 |
| Heavy Turnings | 36.50-37.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola | 43.00-43.50 |
| Charging Box Cast | 40.50-41.50 |
| Heavy Breakable Cast. | 36.50-37.50 |
| Stove Plate | 34.50-35.50 |
| Unstripped Motor Blocks | 38.00-39.00 |
| Malleable | 49.50-50.50 |
| Brake Shoes | 35.00-36.00 |
| Clean Auto Cast | 40.00-41.00 |
| No. 1 Wheels | 42.00-42.50 |
| Burnt Cast | 32.00-33.00 |

Railroad Scrap*

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 42.00-42.50 |
| R.R. Malleable | 50.00-51.00 |
| Axles | 42.00-43.00 |
| Rails, Rerolling | 43.00-44.00 |
| Rails, Random Lengths | 41.00-41.50 |
| Rails, 3 ft and under | 46.00-47.00 |
| Rails, 18 in. and under | 46.00-47.00 |
| Railroad specialties | 47.50-48.00 |
| Uncut Tires | 46.00-46.50 |
| Angles, Splice Bars | 45.00-46.00 |

*Brokers buying prices.

### CLEVELAND

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $38.00-38.50 |
| No. 2 Heavy Melt. Steel | 38.00-38.50 |
| No. 1 Busheling | 38.00-38.50 |
| Nos. 1 & 2 Bundles | 38.00-38.50 |
| Machine Shop Turnings | 31.00-31.50 |
| Mixed Borings, Turnings | 31.50-32.00 |
| Short Shovel Turnings. | 31.50-32.00 |
| Cast Iron Borings | 31.50-32.00 |
| Bar Crops and Plate | 41.00-41.50 |
| Cast Steel | 43.00-44.00 |
| Punchings & Plate Scrap | 41.00-41.50 |
| Heavy Turnings | 37.00-37.50 |
| Alloy Free Turnings | 33.00-33.50 |
| Cut Structurals | 41.00-41.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola | 43.50-44.00 |
| Charging Box Cast | 41.00 |
| Stove Plate | 41.00-41.50 |
| Heavy Breakable Cast. | 40.00 |
| Unstripped Motor Blocks | 40.00 |
| Malleable | 56.00-57.00 |
| Brake Shoes | 42.00 |
| Clean Auto Cast | 46.00 |
| No. 1 Wheels | 44.00 |
| Burnt Cast | 41.00-41.50 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 41.00-41.50 |
| R.R. Malleable | 56.00-57.00 |
| Rails, Rerolling | 44.00 |
| Rails, Random Lengths | 44.00 |
| Rails, 3 ft and under | 48.00 |
| Railroad Specialties | 46.00 |
| Uncut Tires | 43.00 |
| Angles, Splice Bars | 48.00 |

### VALLEY

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $38.00-40.00 |
| No. 2 Heavy Melt. Steel | 38.00-40.00 |
| No. 1 Bundles | 38.00-40.00 |
| Machine Shop Turnings | 34.00-35.00 |
| Short Shovel Turnings. | 34.00-35.00 |
| Cast Iron Borings | 34.00-35.00 |
| Low Phos. | 44.00-45.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 42.00-43.00 |

### MANSFIELD

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $40.00 |
| Machine Shop Turnings | 35.00 |
| Short Shovel Turnings. | 36.00-37.00 |

### CINCINNATI

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $37.00 |
| No. 2 Heavy Melt. Steel | 37.00 |
| No. 1 Busheling | 37.00 |
| No. 1 Bundles | 37.00 |
| No. 2 Bundles | 37.00 |
| Machine Shop Turnings | 31.00 |
| Mixed Borings, Turnings | 30.00 |
| Short Shovel Turnings. | 33.00 |
| Cast Iron Borings | 32.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 47.00 |
| Charging Box Cast | 41.00 |
| Heavy Breakable Cast. | 40.00 |
| Stove Plate | 38.00 |
| Unstripped Motor Blocks | 38.00 |
| Brake Shoes | 35.00 |
| Clean Auto Cast | 46.00 |
| Drop Broken Cast | 50.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt | 40.00 |
| R.R. Malleable | 57.00 |
| Rails, Rerolling | 46.00 |
| Rails, Random Lengths | 44.00 |
| Rails, 18 in. and under | 50.00 |

### DETROIT

(Dealers buying prices, fob shipping point)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $34.50-35.00 |
| No. 1 Busheling | 34.50-35.00 |
| Nos. 1 & 2 Bundles | 34.50-35.00 |
| No. 3 Bundles | 34.50-35.00 |
| Machine Shop Turnings | 27.50-28.00 |
| Mixed Borings, Turnings | 27.50-28.00 |
| Short Shovel Turnings. | 28.50-29.00 |
| Cast Iron Borings | 28.50-29.00 |
| Punchings & Plate Scrap | 39.00-39.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 39.00-40.00 |
| Heavy Breakable Cast. | 33.00-34.00 |
| Clean Auto Cast | 39.00-40.00 |

### BUFFALO

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $37.00-38.00 |
| No. 2 Heavy Melt. Steel | 37.00-38.00 |
| No. 1 Busheling | 37.00-38.00 |
| No. 1 & 2 Bundles | 37.00-38.00 |
| Machine Shop Turnings | 29.50-30.50 |
| Mixed Borings, Turnings | 29.50-30.50 |
| Cast Iron Borings | 29.50-30.50 |
| Short Shovel Turnings. | 31.50-32.50 |
| Low phos | 40.50-41.50 |
| Elec. Furnace Bundles. | 39.50-40.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 40.00-41.00 |
| Heavy Breakable Cast. | 37.00-38.00 |
| Malleable | 48.00-50.00 |
| No. 1 Wheels | 41.00-42.00 |

Railroad Scrap

| | |
|---|---|
| Rails, 3 ft and under | 45.00-46.00 |
| Railroad Specialties | 46.00-47.00 |

### PHILADELPHIA

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $36.50-37.00 |
| No. 2 Heavy Melt. Steel | 36.50-37.00 |
| No. 1 Busheling | 36.50-37.00 |
| No. 1 Bundles | 36.50-37.00 |
| No. 2 Bundles | 36.50-37.00 |
| No. 3 Bundles | 34.50-35.00 |
| Machine Shop Turnings | 28.50-29.50 |
| Mixed Borings, Turnings | 28.50-29.50 |
| Short Shovel Turnings. | 29.50-30.00 |
| Bar Crops and Plate | 40.00-41.00 |
| Punchings & Plate Scrap | 40.00-41.00 |
| Cut Structurals | 39.00-39.50 |
| Elec. Furnace Bundles. | 39.00-40.00 |
| Heavy Turnings | 38.00-39.00 |
| No. 1 Chemical Borings | 34.50-35.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 45.00-46.00 |
| Charging Box Cast | 43.00-44.00 |
| Heavy Breakable Cast. | 43.00-44.00 |
| Unstripped Motor Blocks | 40.00-41.00 |
| Malleable | 58.00-60.00 |
| Clean Auto Cast | 45.00-46.00 |
| No. 1 Wheels | 46.50-47.50 |

### NEW YORK

(Dealers buying prices, fob shipping point)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $32.00 |
| No. 2 Heavy Melt. Steel | 32.00 |
| No. 1 Busheling | 32.00 |
| Nos. 1 & 2 Bundles | 32.00 |
| No. 3 Bundles | 31.00 |
| Machine Shop Turnings | 24.00-25.00 |
| Mixed Borings, Turnings | 24.00-25.00 |
| Short Shovel Turnings. | 26.00-27.00 |
| Punchings & Plate Scrap | 34.00-35.00 |
| Cut Structurals | 34.00-35.00 |
| Elec. Furnace Bundles. | 33.00 |
| No. 1 Chemical Borings | 24.50-25.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 36.00-37.00 |
| Charging Box Cast | 36.00-37.00 |
| Heavy Breakable | 36.00-37.00 |
| Unstripped Motor Blocks | 34.00 |
| Malleable | 52.00-54.00 |

### BOSTON

(Fob shipping point)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $29.00-29.75 |
| No. 2 Heavy Melt. Steel | 29.00-29.75 |
| Nos. 1 & 2 Bundles | 29.00-29.75 |
| No. 1 Busheling | 29.00-29.75 |
| Machine Shop Turnings | 24.00-25.00 |
| Mixed Borings, Turnings | 25.00-26.00 |
| Short Shovel Turnings. | 26.00-27.00 |
| Bar Crops and Plate | 31.00-32.00 |
| Punchings & Plate Scrap | 31.00-32.00 |
| Chemical Borings | 25.00-26.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 42.00-44.00 |
| Charging Box Cast | 38.00 |
| Heavy Breakable Cast. | 38.00-39.00 |
| Stove Plate | 35.00-36.00 |
| Unstripped Motor Blocks | 32.00-34.00 |
| Clean Auto Cast | 40.00-42.00 |

### CHICAGO

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $38.50-39.00 |
| No. 2 Heavy Melt. Steel | 38.50-39.00 |
| No. 1 & 2 Bundles | 38.50-39.00 |
| No. 3 Bundles | 36.50-37.00 |
| Machine Shop Turnings | 33.50-34.00 |
| Mixed Borings, Turnings | 33.50-34.00 |
| Short Shovel Turnings. | 35.50-36.00 |
| Cast Iron Borings | 34.50-35.00 |
| Bar Crops and Plate | 41.00-41.50 |
| Cast Steel | 41.00-41.50 |
| Punchings | 41.00-41.50 |
| Elec. Furnace Bundles. | 39.50-40.00 |
| Heavy Turnings | 38.00-38.50 |
| Cut Structurals | 41.50-42.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 42.00-45.00 |
| Malleable | 42.00-45.00 |
| Clean Auto Cast | 42.00-45.00 |
| No. 1 Wheels | 42.00-45.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 40.00-40.50 |
| Rails, Rerolling | 46.00-46.50 |
| Rails, Random Lengths | 41.50-42.00 |
| Rails, 3 ft. and under. | 44.00-44.50 |
| Rails, 18 in. and under | 44.50-45.00 |
| Railroad Specialties | 43.00-43.50 |
| Angles, Splice Bars | 43.00-43.50 |

### ST. LOUIS

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $39.50-40.50 |
| No. 2 Heavy Melt. Steel | 38.50-39.50 |
| Machine Shop Turnings | 32.00-33.00 |
| Short Shovel Turnings. | 34.00-35.00 |

Cast Iron Grades (Fob shipping point)

| | |
|---|---|
| No. 1 Cupola Cast | 40.00-41.00 |
| Charging Box Cast | 37.00-38.00 |
| Heavy Breakable Cast. | 35.00-36.00 |
| Brake Shoes | 37.00-38.00 |
| Clean Auto Cast | 41.00-42.00 |
| Burnt Cast | 35.00-37.00 |

Railroad Scrap

| | |
|---|---|
| R.R. Malleable | 54.00-55.00 |
| Rails, Rerolling | 45.00-46.00 |
| Rails, Random Lengths | 42.00-43.00 |
| Rails, 3 ft and under | 45.00-46.00 |
| Uncut Tires | 43.50-44.50 |
| Angles, Splice Bars | 40.00-41.00 |

### BIRMINGHAM

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $34.00-35.00 |
| No. 2 Heavy Melt. Steel | 34.00-35.00 |
| No. 1 Busheling | 34.00-35.00 |
| Nos. 1 & 2 Bundles | 34.00-35.00 |
| No. 3 Bundles | 31.00 |
| Long Turnings | 24.50 |
| Short Shovel Turnings. | 26.00-27.00 |
| Cast Iron Borings | 25.00 |
| Bar Crops and Plate | 38.50 |
| Cut Structurals | 38.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 41.00 |
| Stove Plate | 39.00 |
| No. 1 Wheels | 36.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 37.00 |
| R.R. Malleable | 42.50 |
| Axles, Steel | 39.00 |
| Rails, Rerolling | 41.00 |
| Rails, Random Length. | 39.00 |
| Rails, 3 ft and under | 41.00 |
| Angles and Splice Bars. | 41.00 |

### SAN FRANCISCO

| | |
|---|---|
| No. 1 Heavy Melt. Steel | *$22.00 |
| No. 2 Heavy Melt. Steel | *22.00 |
| No. 1 Busheling | *22.00 |
| Nos. 1 & 2 Bundles | *22.00 |
| No. 3 Bundles | *17.00 |
| Machine Shop Turnings | *12.50 |
| Bar Crops and Plate | 22.00 |
| Cast Steel | 22.00 |
| Alloy Free Turnings | 12.50 |
| Cut Structurals | 22.00 |
| Tin Can Bundles | 17.00 |

Railroad Scrap

| | |
|---|---|
| Axles | 29.00 |
| Rails, Random Lengths | 23.50 |
| Uncut Tires | 30.50 |

*Fob California shipping point.

### SEATTLE

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $22.00 |
| No. 2 Heavy Melt. Steel | 22.00 |
| No. 1 Busheling | 22.00 |
| Nos. 1 & 2 Bundles | 22.00 |
| No. 3 Bundles | 20.00 |
| Machine Shop Turnings | 13.50 |
| Mixed Borings, Turnings | 13.50 |
| Punchings & Plate Scrap | 23.50 |
| Cut Structurals | 23.50 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 27.50 |
| Charging Box Cast | 22.50 |
| Heavy Breakable Cast. | 21.50 |
| Stove Plate | 23.00 |
| Unstripped Motor Blocks | 21.50 |
| Malleable | 27.50 |
| Brake Shoes | 27.50 |
| Clean Auto Cast | 27.50 |
| No. 1 Wheels | 24.00 |

Railroad Scrap

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | 20.00 |
| Railroad Malleable | 27.50 |
| Rails, Random Lengths | 20.00 |
| Angles and Splice Bars | 21.50 |

### LOS ANGELES

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $22.50 |
| No. 2 Heavy Melt. Steel | 22.50 |
| Nos. 1 & 2 Bundles | 22.50 |
| Machine Shop Turnings | 16.00 |
| Mixed Borings, Turnings | 15.50-16.00 |
| Punchings & Plate Scrap | 28.00 |
| Elec. Furnace Bundles. | 28.00 |

Cast Iron Grades

| | |
|---|---|
| No. 1 Cupola Cast | 35.00-36.00 |

## Sheets, Strip . . .

### *Some producers planning to block out most of October rolling schedules*

Sheet Prices, Page 130

**Pittsburgh** — Some producers are planning to block out most of October rolling schedules in an effort to clear up carryover tonnage accumulated this year to date, which in some instances will represent tonnage previously promised for August shipment. Cooler weather is expected to make possible an increase in production pace through the final quarter of the year. No easing in pressure on the mills for any of the sheet and strip items has yet developed, with customers reportedly operating on a hand-to-mouth basis in respect to inventories. Sheet and strip output is not expected to be in balance with demand until late first quarter next year at earliest despite fact additional cold-reduction mill capacity probably will be brought into service in the interim. However, a number of these units are scheduled for tin plate production, while finishing mill speed-up programs, necessitating the taking of some of the older units out of service during this period, constitute offsetting factors.

**New York** — Pressure for sheets is expected to increase now that the vacation season is over and consumers are attempting to maintain a higher and more uniform production. There actually may also be some improvement in sheet production as seasonal conditions become more favorable. However, considerable tonnage shipped from now on over the remainder of the year will be against old orders, with new quotas for fourth quarter being smaller than in the current period. Cold-rolled sheets, galvanized sheets and enameling stock are especially critical. As a matter of fact, little sheet tonnage is readily available, except stainless, and the situation in this latter material is a little tighter than it was. However, mill deliveries can still be had in four to five weeks and at some of the local warehouses. Stainless steel is still being offered on a tie-in basis to consumers who are pressing for some of the more critical items.

**Boston** — Narrow cold-rolled strip order backlogs are gradually settling with shipments topping incoming volume, and if it were not for unbalance in hot strip inventories for rerolled, inroads on backlogs would be greater. While consumer inventories appear to be in better shape, there are numerous consumers pressing for tonnage, notably chain and anti-friction bearing producers. Low carbon stock supply is limited, several mills concentrating mostly on high carbon. For some grades and sizes there are small openings for December. In sheets, only stainless balances demand and there is fair inquiry for that grade. Hot-rolled carbon, galvanized, electrical and enameling stock allocations for fourth quarter are generally slightly lower. The number of producers now selling hot-rolled in this area has declined steadily.

**Philadelphia** — Sheet consumers generally are disappointed over quotas which have been set up for the fourth quarter, although not greatly surprised because of the lag in current quarter shipments. They probably stand to get more tonnage over the final three months than in the current period, as shipments are likely to increase, but insofar as new contract ton-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## *Here's how one* BAKER TRUCK *customer did it:*

In many plants Material Handling—like Topsy—just grew. Equipment for mechanizing individual handling operations was acquired piece-by-piece as needed. Although time and cost advantages were gained in each case, a lack of integration between departments usually prevented full realization of all the benefits possible.

Take the case of the Hammermill Paper Company in Erie, Pa. Their problem involved handling in process, storing, routing and loading an annual production well over 100,000,000 lbs. of some 3,000 kinds, sizes and colors of paper. Each department had its own electric trucks—and controlled its own handling operations.

Two years ago, after extensive study by its engineers, the company incorporated all trucks and handling personnel under one department, headed by a qualified expert who administered

*Substantial savings were made by using a Baker Hy-Lift Truck with special tilt-type platform for charging beaters with pulp.*

details and expedited the material handling program. Immediate benefits were:

1. Full utilization of trucks and personnel
2. More material handled with same equipment
3. Better maintenance of equipment
4. Improved transportation service in operating departments
5. Reduction in material handling costs

A survey, after the new program had functioned for six months, showed that centralized, as against departmental control, resulted in the utilization of existing trucks to the best advantage in receiving, production, warehousing and shipping departments—providing maximum service at minimum cost.

The program had also resulted in the adoption of the pallet-fork truck method for handling raw, in-process and finished product. Materials such as clay, starch and talc are received in bags. Substantial savings were made by palletizing these bags on arrival and transporting unit loads by fork truck to storage and to production. Still further savings will come when all suppliers can be persuaded to ship material on pallets—negotiations for which are under way. It now takes about 14 hours to palletize a car of 1600 bags—weighing about 50 lbs.—but when material arrives already palletized unloading and warehousing can be completed in about 2 hours per car.

Palletizing also resulted in cutting unloading time of knocked-down shipping cartons from 24 hours per car, when they arrived loose, to approximately 3 hours, since they arrive in unit loads strapped to pallets, permitting fork-truck handling.

Additional benefits from centralized control of handling were reported when another survey was made at the end of 1946. Departmental superin-

*Baker Fork Truck picking up unit load of lap pulp for loading into box-car for shipment.*

tendents, freed of material handling problems could now concentrate on production. Plant safety had been improved. Extension of mechanized handling eliminated much heavy manual labor—making these men available for higher paid, productive work. Work flow has been made more efficient and direct. With all handling under one control, proper allotment assures adequate equipment for all departments. Maintenance costs on trucks were lowered. The pallet-fork truck method, besides saving as mentioned, effectively solved the problem of handling a wide diversity of products and sizes of packages

*Baker Fork Truck tiering pallet loads of bagged starch in storage. Note method of "locking" sacks to prevent side-slipping.*

—incoming materials and out-going products.

A new warehouse, just completed, was designed around mechanized handling of unit loads. Tractor-trailer trains are assisted by fork trucks—permitting efficient, orderly storage, full utilization of space by tiering, and speeding order assembly for shipment.

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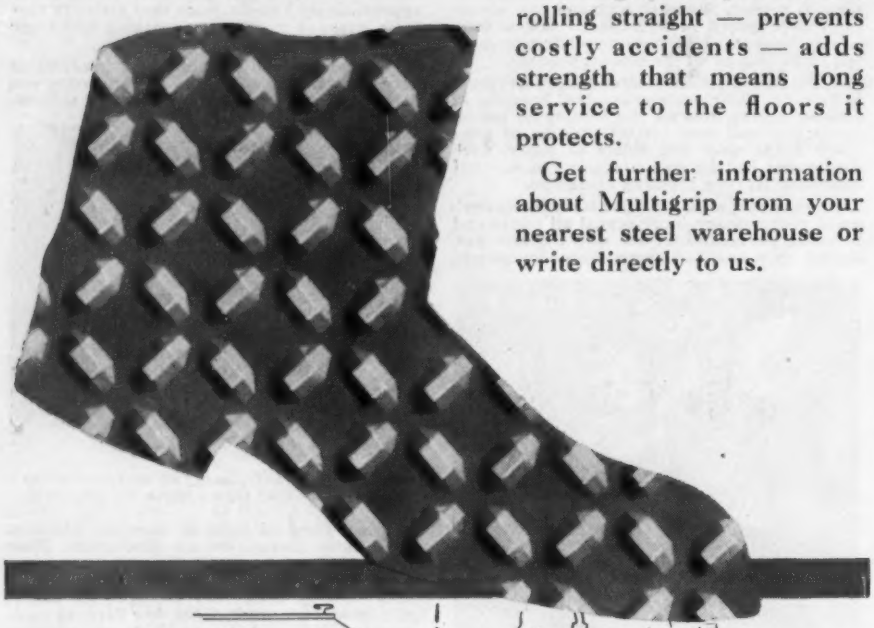

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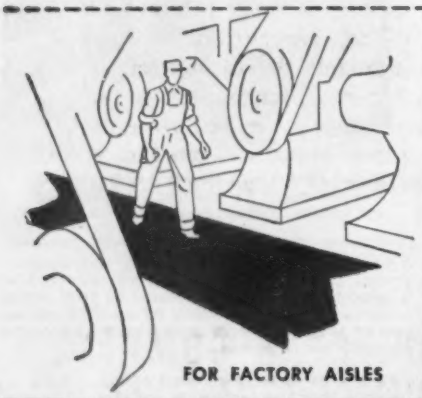

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UNITED STATES STEEL


nage is concerned they will get appreciably less in most cases.

**Chicago** — Producers of sheets and strip are making no headway in gaining on their tremendous order backlogs, forecasting substantial carryovers at the end of third quarter. Some reports are heard of mills reducing fourth quarter quotas to customers in order to reduce year-end carryovers, but this practice is by no means universal. Production lost during the recent extended heat wave aggravated the situation. Some mills prefer to go through balance of the year on present schedules before determining to reduce customer quotas in first quarter. Thought behind this is that something may yet happen which will reduce overall demand. Electrical sheets continue tight, although manufacturers of some seasonal items have somewhat lessened their requirements.

**Cincinnati**—Sheet mills are under constant pressure for shipments and for extra tonnage. Prolonged tightness in the market, of course, eliminates seasonal slackness in some lines and the situation therefore excludes other users from gaining this tonnage. District production this quarter has been at a high level so that increase in allotments is improbable.

**Birmingham**—The sheet situation remains one of the tightest in the district. Sheet supplies for the balance of the year will be short and will extend over into the first of 1948, at least. Sheet processors are discouraged over the prospects for enough tonnage to maintain normal schedules. Some strip is being produced consisting for the most part of cotton ties.

**St. Louis** — Production of sheets continues to show a slight improvement. Open hearths are turning out a few more tons per furnace day—perhaps 10 per cent more—mainly because of improved scrap quality. Pig iron supplies are somewhat better too. Shipments of finished steel were up in August and indications continue fair that backlogs may be worked off by the year end. Granite City Steel's books for 1947 were never officially opened, as it sought to work off the carryover. Schedules for 1948 may be opened next month, the date depending on progress this month.

## Steel Bars . . .

Bar Prices, Page 130

**New York** — Brisk demand continues for hot carbon bars, especially for the small and medium sizes, and there is a little better demand than there was for the larger specifications, reflecting particularly requirements of the car and locomotive builders and railroads. Nevertheless, consumer quotas in the fourth quarter should be generally as heavy, if not heavier, than at present. As they are now set up they are at least as heavy.

**Philadelphia** — Small hot carbon flats and rounds remain in tight supply, with little or no improvement, and there is relatively little change with respect to the medium sizes, which for some time have not been in as stringent demand as the small ranges. Large specifications have been in easiest supply of carbon sizes, although recently demand has tightened a bit as result of railroad requirements. In general, producers are not far behind on current commitments, except in the small sizes and in this they appear to be holding their own. This, however, is due to their refusal to meet all the demands which are being made upon them and to their policy of confining allotments to regular customers.

**Boston** — Revisions and changes in specifications tried earlier by some bar users are subsiding and in most cases substitutions have not registered. Builders of textile mill equipment have adopted magnesium and aluminum extruded parts to greater extent, but more at the expense of castings than of bars. Although less apparent in hot-rolled carbon stock, the general supply situation in bars is gradually improving, accompanied by a slight letdown in demand, notably cold-finished. Most users of hot-rolled carbon will take up fourth quarter allocations, but inventory positions vary considerably and some consumers estimate quotas for the period will be below requirements.

**Pittsburgh** — New demand for cold-finished carbon and alloy bars continues well below that recorded earlier this year, reflecting inventory adjustment on part of customers and fact that new orders now represent tonnage for inventory replacement rather than for building up inventory pipe lines. Producers are offering 60 to 90 days' delivery for most size classifications, although order backlogs are still extended 4 to 6 months on some of the smaller carbon bar sizes. New demand from screw machine plants in particular is cited as being considerably below monthly average volume registered during the first half this year.

## Plates . . .

Plate Prices, Page 131

**Pittsburgh** — Sellers state present plate demand is heaviest noted since termination of the war and there is no indication of any easing in present order volume through remainder of this year. Bulk of shipments continue to be channeled into the railroad car construction program and to fabricators of storage tanks, heavy machinery equipment, barges and large diameter pipe. Reflecting a number of interruptions to production schedules this year to date, one leading interest will limit its entire output during October to carryover tonnage commitments and even this step will leave equivalent of about 15 days' output for carryover. Some mills report monthly plate shipments to freight car builders have exceeded those originally promised, and add that the industry has more than met its commitments in respect to supplying sufficient steel for the freight car construction program.

**Boston** — Demand for plates for large pipe fabrication is heavy and car building shops are also absorbing a substantial volume. Shipments to warehouses frequently include mixed sizes. Distribution is hobbled by selectivity in order acceptance and price differentials. Some mills take a minimum of light tank quality carbon tonnage while those booking that grade are heavily loaded.

**New York** — Although tank fabricators report a little better balance in their inventories, the situation in general with respect to plate supply is tight. Mills are well covered over the remainder of the year and all are behind on current commitments in varying degrees. While at least one or two of the eastern mills will enter the fourth quarter with arrearages amounting to no more than two weeks' production, the majority are in a less satisfactory position. Some will have carryovers of several weeks, in fact. So excessive is demand that the plate mills are still continuing their practice of selecting only the more attractive tonnages.

**Philadelphia** — Plate demand continues

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in excess of production, and while some mills are catching up somewhat on their order backlogs this is due principally to selectivity in accepting new tonnage. Some producers are accepting limited business for shipment in the first quarter of next year, but most are refusing to book that far ahead and as a practical result are out of the market, having made their alloments for fourth quarter, with certain allowances for export which are yet to be filled in. In some cases tonnage can still be had before the end of the year, where producers are awarded special forming and are in position to do so.

One of the few important ship construction jobs to come up in a long while involves five 500-ft combination passenger-cargo vessels for the American President Lines Ltd., with the Maritime Commission, Washington, to take bids Sept. 12, after a postponement from Aug. 13.

**Birmingham**—Plates move in volume exceeding current production in this section. Need for heavier gage plates is being supplied occasionally from other districts. Overall demand continues heavy, especially for car building and ship construction and repairs. Not too much optimism is evident over the plate situation for the first quarter of next year.

**Seattle** — Plate shops are in full operation, a large volume of the jobs requiring 10 to 60 tons of material each, mostly for tank and boiler work. No large projects involving plates are up for immediate attention. Plate supplies continue inadequate, allocations being under area requirements as long as water shipments are uncertain due to labor troubles.

## Wire . . .

Wire Prices, Page 131

**Boston** — Delivery pressure has eased for some wire products but for high carbon specialties and manufacturers wire most fourth quarter allocations will be taken in. That inventories are better balanced in some directions is indicated by less pressure from the automobile industry for valve spring material. Round wire for flattening is tight, as are all merchant products. Export volume is slowing accompanied by some cancellations of duplicate orders for South America.

**Chicago** — Demand for all wire and wire products continues heavy with customers' requirements exceeding production. This holds for merchant as well as manufacturers' and construction items. Among products especially tight are paving fabric and accessories. In many instances, the inability to obtain conductors and other necessary materials is retarding construction of rural electric power distribution systems and telephone lines.

**Birmingham** — All specifications in wire remain in short supply. Bailing wire is reported scarce in some sections of the state, nails, fencing and manufacturers wire generally. Supplies are being doled out in insufficient volume to meet current needs.

## Tubular Goods . . .

Tubular Goods Prices, Page 131

**Boston** — Merchant steel pipe demand is unabated with buying for heating uses heavier. Utilities, short of pipe for extensions and replacements this year, hope for more tonnage in 1948. If they get more and if district allocations are unchanged, part of distributors' tonnage may be affected. Actually heavy demand on distributor stocks is partly due to limited direct shipments to larger users; to fill requirements normally shipped direct, inventories are kept down. While steel pipe is notably tight, as is soil pipe, there is some improvement in other tubular products. The trend toward diesel from steam locomotives by New England railroads is having an increasing influence on boiler tube demand.

**Seattle** — Cast iron pipe agencies report a slow market, largely seasonal, but expect renewed interest in the near future. No large projects are up for bids in the area. Mills are in improved position, one interest reporting deliveries reduced to 14 months from 24 months not long ago. Interrupted water service from the Atlantic and Gulf is holding back long-deferred deliveries.

## Tin Plate . . .

Tin Plate Prices, Page 131

**Pittsburgh** — The passing of the peak tin plate requirements for the perishable food pack program next quarter should result in increased pressure for general line can specifications largely requiring electrolytic. No significant change in container companies' tin plate inventory position is indicated through remainder of this year, despite pressure to augment stocks as a hedge against an indicated


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price advance on Jan. 1. Relatively large carryover tonnage and urgency of present demand prompted some tin plate producers to operate on Labor Day. With mill production allotments based on practical capacity operating schedules through fourth quarter, it appears improbable all this carryover tonnage will be cleared up by year-end. Shortage of pig tin is expected to restrict tin plate output well into 1948, with result that any increase in output next year will likely be restricted to black plate and electrolytic. In this respect it is encouraging to note that Jones & Laughlin Steel Corp. plans to have its new cold-reduction tin mill in operation by late this year, and that a number of programs are under way aimed at speeding up electrolytic lines.

**Chicago** — Consumers of tin plate have suffered somewhat in recent weeks by inability of mills to meet stated shipping schedules. Excessively hot weather, which reduced ingot output, is given as the explanation. Under present conditions, it is doubtful if mills can make up lost ground speedily, which means that tonnage must be carried over month to month, thereby delaying future orders.

## Reinforcing Bars . . .

**Reinforcing Bar Prices, Page 130**

**Pittsburgh** — Mill monthly production quota schedules for next quarter are expected to remain substantially unchanged from the current period. Sellers state new inquiries are holding up very well, and due to the unbalanced demand-supply situation concrete bar distribution will continue under strict allocation, possibly through first quarter of next year. Rerollers have been an important factor in helping relieve the present shortage of reinforcing bars, but their operations have been retarded by scarcity of good quality rerolling rails. Larger producers continue to channel a considerable portion of their concrete bar output to fabricating subsidiaries because of the better profit realized. New inquiries for jobs in this district have been relatively light, with highway work predominating. Bids closed Sept. 2 on 900 tons for Dravosburg, Pa., bridge.

**Chicago** — Suppliers of reinforcing steel display little interest in new construction projects, either industrial or public, explaining their situation as that of being oversold and unable to obtain full mill quotas. Because reinforcing bars and paving mesh are far short of demands, entailing long delays in receipt even if requirements can be booked, sponsors of new construction frequently postpone indefinitely or delay projects advertised for bids.

**Seattle** — Rolling mills in this area are operating at top capacity, while facing a formidable order backlog. Northwest Steel Rolling Mills has resumed operations following repairs of its electric furnace. While much new business is being offered, it is largely confined to projects financed by federal or state funds. There is a marked decline in private jobs, rising costs being blamed. Small tonnages predominate, aggregating a sizable total.

## Structural Shapes . . .

**Structural Shape Prices, Page 131**

**Philadelphia** — Structural demand is showing a little more life. Orders are still spotty, but inquiry reflects some improvement.

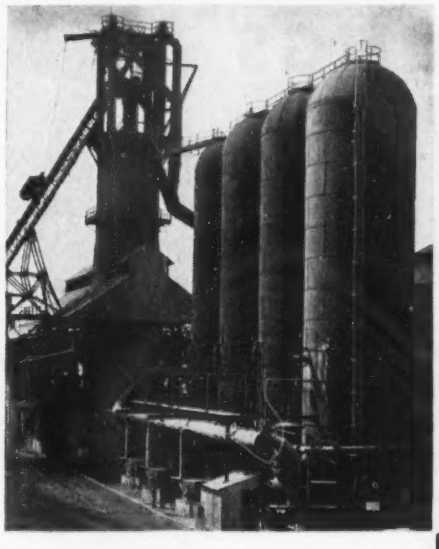
While not as stringent as flat-rolled products, shapes remain in fairly tight supply.

**Pittsburgh** — Steadily rising construction costs continue to force shelving of a number of building programs. However, most interests believe many delayed projects will eventually materialize. More active bidding on pending work is noted among fabricators, although most still have substantial tonnages on their books. Structural tonnage involved in new inquiries is off somewhat from the level recorded earlier this year due to the fact that construction costs are well above previous estimates and exceed money outlays for many jobs.

**Chicago** — Structural fabricators, with heavy backlogs for months ahead, have been receiving somewhat reduced receipts of plain shapes from mills, the effect of the recent heat wave which cost some steel ingot output and the tonnages available to structural mills.

**Birmingham**—Shape output is hardly as great in the current quarter as it was the first of the year. Demand has slackened proportionately as far as consistency is concerned. Some scattered but relatively light tonnage is being sought in shapes, but a big scale revival in demand is expected next year.

**Seattle** — Fabricators have considerable work on hand and report offers of many small projects, involving 20 to 50 tons each.

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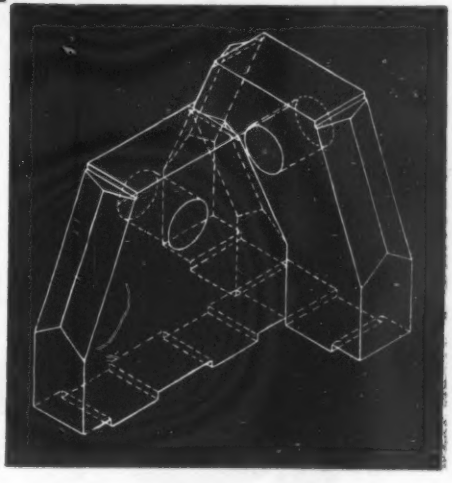

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## Ferroalloys . . .

*Electro Metallurgical Sales Corp. announces price increases effective Oct. 1*

Ferroalloy Prices, Page 133

**New York** — Because of rising costs of raw materials Electro Metallurgical Sales Corp., of this city, announced Sept. 3, revised prices for contract users, which will become effective Oct. 1. Proportionately higher prices became effective immediately on a spot basis.

Specific increases in the silicon alloys (Eastern zone, carload, lump, bulk) are as follows: 50 per cent ferrosilicon—current price 7.8 cents a pound of contained silicon, new price 8.8 cents; low-aluminum 65 per cent—current price 10.3 cents, new price 11.55 cents; 75 per cent—current price 10 cents, new price 11.2 cents; 85 per cent, current price 11.3 cents, new price 12.7 cents; 90 per cent—current price 12.8 cents, new price 14.35 cents. Corresponding increases apply in the low-aluminum grades of 50 per cent, 75, 85 and 90 per cent ferrosilicon. Silicon metal prices are increased 2 cents a pound in all grades, quantities, and sizes; 15 per cent ferrosilicon in the finely ground sizes is raised $10.75 a gross ton.

All grades of ferrochrome, both high-carbon and low-carbon, are increased 2 cents a pound of contained chromium in all quantities and sizes. The base prices of chromium metal are increased 7.5 cents a pound of contained chromium.

Standard ferromanganese is raised $15 a gross ton, making the new carload base price $150 per gross ton. Medium- and low-carbon ferromanganese are raised 2 cents a pound of contained manganese in all grades, quantities, and sizes, making the new carload, lump, bulk price for medium-carbon ferromanganese 16.5 cents per pound of manganese contained in the alloy. Silicomanganese base prices are raised from 6.65 cents a pound of alloy to 7.4 cents in the maximum 1.50 per cent carbon grade, and from 6.55 cents to 7.20 cents in the maximum 2.0 per cent carbon grade. Low-iron ferromanganese is up 1.5 cents per pound of contained manganese, and manganese metal is up 2 cents per pound of metal.

Increases in the briquetted alloys are as follows: Silicon briquets up 0.55 cent making the new price 4.65 cents a pound for the large size and 4.8 cents a pound for the small size; chromium briquets up 1.25 cents making the new price 11.1 cents; ferromanganese briquets up 1 cent making the new price 8 cents; and silicomanganese briquets up 0.9 cent making the new price 7.65 cents.

All grades of ferrovanadium are raised 20 cents a pound of contained vanadium. Vanadium oxide is raised from $1.10 a pound to $1.20.

Increases in the zirconium alloys are as follows: The 12-15 per cent grade up 0.5 cent a pound to 6 cents; the 35-40 per cent grade up 1.4 cents a pound to 18.4 cents.

New prices for some miscellaneous alloys include: Calcium-silicon 15.5 cents a pound; calcium-manganese-silicon 16.75 cents; "SMZ" alloy 14.3 cents; "CMSZ" mixes 15.75 cents; "Silcaz" alloy 37 cents; Special Graphitizer 14.75 cents; calcium metal $1.85; and ferromanganese-silicon mix 14.25 cents.

## Pig Iron . . .

*Concern expressed over outlook for pig iron despite heavy 1947 output*

Pig Iron Prices, Page 132

**New York** — Although district pig iron consumers are hopeful of stepping up their production somewhat this month, with the passing of hot weather and the vacation season, they are still greatly concerned over the outlook for pig iron and coke. More seasonal weather conditions should stimulate supply of both of these products to a certain extent; nevertheless, receipts will undoubtedly continue to fall far short of requirements not only for this month but for some time to come.

Pig iron production this year should be substantially heavier than in 1946, when steel and coal strikes caused considerable disruption, holding output to 44,854,801 net tons. On basis of the average rate for the first seven months, pig iron production this year should amount to 57,790,884 tons. The trend for the past several months has been downward, with July production at 4,531,619 tons, or at an annual rate, incidentally, of 54,379,428 tons. The August production figure is not yet available, but output generally is conceded to be even under the July figure. However, a moderate upswing is expected this fall unless the coal situation becomes more acute.

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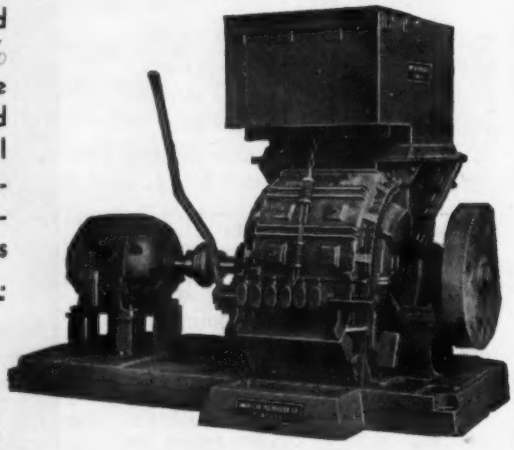

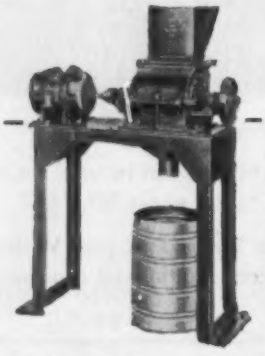

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materials has been downward, and adding to the situation have been substantial exports of coal abroad, not only steam coal, but also coal suitable for production of metallurgical coke (although apparently its ultimate use will be mainly for other purposes). However, there is a feeling that as fall sets in there will not only be some improvement in production of coal for metallurgical coking purposes, but also some improvement in the number of available freight cars, which at present is complicating the situation.

Discouraging with respect to the outlook for oven foundry coke, which is described as the more efficient blast furnace fuel on an average, is the fact that about 30 per cent of this type ovens in the country are over 30 years of age. Some extensive repairs are under way and this, in fact, is being reflected in present restricted production of coke, but there is much more work to be done, and while some new batteries are under construction and others are contemplated, trade interests believe that they will little more than offset the replacement of various old units. Further, the cost of building new ovens has stepped up heavily over recent years and that is having a retarding effect on new work.

Current blast furnace capacity for the country is 65,709,200 tons, as compared with 67,340,590 tons last year, this including ferroalloys as well as pig iron. Peak capacity was in 1944, with 67,391,207 tons.

Some iron has been coming east from Pueblo, Colo. It is understood that furnace has booked orders for something like 15,000 tons for shipment to the Middle West and eastern seaboard over the remainder of the year and is now completely out of the market.

**Cleveland**—Shipments of iron by one of the area's leading producers were being billed last week at $38.25 for basic, $38.75 for No. 2 foundry and $39.25 for malleable in line with that company's policy of tying its iron prices to the quoted price for heavy melting scrap. Other producers continue to quote $35.50 for basic with the usual differentials for the other grades. Amount of the district's melt is currently decreased with one furnace of Republic Steel Corp. down for relining.

**Boston** — Consumers of basic are operating with dangerously low inventories with one exception and any interruptions in delivery would soon be reflected in lower steelmaking rates. Part of this basic supply is tied in with scrap prices and added to costs is all rail freight. Foundry melt is slightly higher this month, but supply of iron is no heavier, with the bulk of the foundries operating with Mystic tonnage and a high ratio of scrap. A few gray iron foundries could handle more volume.

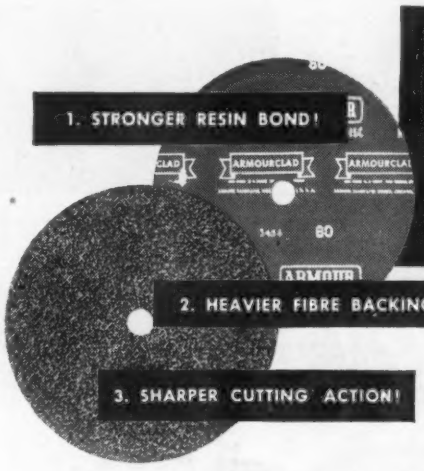
**Philadelphia** — While pipe makers, engaged in work for the housing program, have been promised as much iron this month as last, consumers generally will consider themselves fortunate if they receive as much tonnage as in August. Daily production at most blast furnaces may show a slight increase; however, this may be more than offset by one less production day this month and by suspension at one district furnace for relining, a matter which may require six to eight weeks for completion. One basic consumer is continuing to get assistance from well outside the district, having been successful in placing an order for 2000 tons with a midwestern furnace.

**Buffalo** — Increased pressure for pig iron shipments by local foundries has cut further into the movement of district iron to New England and seaboard consumers. Producers report urgent requests for iron from eastern buyers which they are unable to fill. Some melters in outlying sections are reported operating only three days a week because of inadequate pig iron supplies. Local foundry operations are as near to normal as available supplies will permit and cooler weather has erased any curtailment in output caused by the recent excessive heat. Producers also find that a scarcity of railroad cars is again interrupting shipping schedules.

**Chicago** — Foundries which lost considerable production of castings because of the heat wave are now trying to make up lost ground, but short supply of pig iron limits the rapidity with which they can step up operations Output of iron also suffered to some extent from the extended hot period, aggravating an already tight situation.

**Cincinnati** — Extremely hot weather during August tended to a lighter foundry melt, with consequent relaxation of pressure for pig iron. Hoping for the usual seasonal upturn in September, the foundries once again are seeking more tonnage, whereas allocations show no change from August when southern shipments to this district were trimmed.

**Birmingham** — Pig iron users have little to say about the supply situation except that it apparently gets tighter and tighter. With one furnace on ferro, and the Gadsden stack down, no hope is held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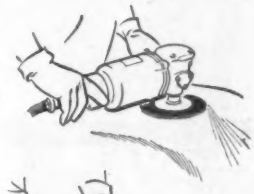

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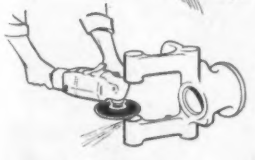

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for even relatively early improvement. Operating schedules, of course, are adjusted accordingly with the result that production is suffering.

**St. Louis** — Pig iron production locally continues at capacity, with shipments from outside remaining constant. Demand has resumed its former level since settlement of a foundry strike. Biggest consumer in this area, Granite City Steel, is being supplied its full needs of hot metal now, following a 60 per cent rationing in effect nearly a year. The 1000-ton daily output of the two local furnaces is divided equally between basic and foundry iron. All production is being shipped, with no attempt at ground stock accumulation.

## Warehouse . . .

Warehouse Prices, Page 133

**Cleveland** — Steel deliveries from warehouses are proceeding at almost the same rate as shipments from mills are received, and distributors, consequently, are unable to build up inventories, except in those products relatively long in supply and short in demand. This situation has changed very little over the summer, warehouses reporting that gains made in inventories in one month are lost the next. The shortage of carbon steel structural shapes has forced some customers to buy alloy structurals whenever they are available, with a resulting increase in raw materials costs.

Demand for all the scarce products is holding up well although some interests see in a continuing shortage of these items an eventual scaling down of buying in the long-supply steel products because of inability to keep production rates at the current high level. The continuing shortage of flat-rolled products is discouraging many customers from sending large numbers of inquiries for warehouse steel they once did; warehousemen say this trend indicates not a lessening of demand but rather an awareness of the impossibility of satisfying it.

Part of the distributors' problems in trying to keep their customers supplied comes from the necessity of buying only a limited number of steel sizes to keep within their mill allotments. In determining the tonnages of particular sizes to order months before mill deliveries can be made, distributors have to anticipate customers' requirements almost before the customers themselves know what these requirements will be.

**Boston** — Want of balance in warehouse stocks will continue to affect sales and distribution through the final quarter. No material improvement in supply of the most critical products is foreseen; allocations of most grades of sheets, stainless excepted, are under heavier demand now that consumer vacation periods have ended. Structurals, plates, and most strip and wire products are below warehouse requirements, although some spotty improvement in available tonnage may develop in several of these products before sheets. Inventories in some products are sufficient, with distributors ordering new tonnage on a replacement demand basis; cold-finished carbon bars, hot-rolled bars in larger sizes, alloys, tool steel and all stainless items are in this category.

**New York** — Third quarter galvanized sheet quotas will not be met, falling 15 per cent short. Of the short-supply products, only structurals show improvement in wider flange sizes. While flat-rolled quotas for fourth quarter are in some in-

stances lower, several other products are about as scarce as sheets. Included is pipe in butt weld sizes and ½-in. galvanized for the plumbing trade. Demand for bars, including hot-rolled carbon, has slackened slightly. Shipments of plates to warehouses are frequently in odd-lot sizes.

**Philadelphia** — Jobbers experienced a slight decrease in August business, although they could have sold much more flat-rolled tonnage if they had had it, and more in certain size ranges of bars and shapes. The situation in galvanized was never more acute, they claim. Considering seasonal influences, however, general business last month was better than many had anticipated. Business in September should be at least sustained, with much depending, of course, upon mill receipts. Interestingly, a large distributor reports that mill shipments for the first eight months of this year amounted to 95 per cent of outbound tonnage.

**Chicago** — Warehouses are suffering in their inventory position as mill receipts decline from hot weather and vacation influence. Customer requirements remain at high level. All flat-rolled products are scarce and inadequate for requirements, with similar situation in small carbon bars, light structurals and some wire items. Some drop in demand for stainless steel, alloys, large sizes of bars and cold-finished bars is reported.

## Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 131

**Cleveland** — Higher prices for large and small rivets have been announced by Champion Rivet Co., this city, effective Oct. 1. After that date the company will also discontinue its practice, which has been in effect in the current quarter, of quoting firm prices for orders shipped during the quarter and will bill on the basis of prices in effect at time of shipment. Under the new list, rivets, ½-in. diameter and larger, are quoted at $5.65 per cwt. Rivets 7/16-in. diameter and smaller will be sold at 55 per cent off standard list prices. These prices are quoted fob Cleveland and Chicago and/or freight equalized with Pittsburgh and Birmingham except in cases where the equalization is too great.

Effective Sept. 1, the company also announced higher prices on rivets for export shipment. Large rivets (½-in. diam. and larger) are now $6.25 per cwt in carload quantities and $6.50 per cwt in less than 40,000 lb lots. Small rivets (7/16-in. diam. and smaller) are 40 per cent off list in all quantities. Prices are fob Cleveland with freight allowed to New York. These prices apply on orders received after the effective date and on back orders which cannot be shipped prior to Sept. 30.

**Pittsburgh** — Sellers report no significant change in the order volume trend the past few weeks, with demand for smaller size ranges exceeding output by a substantial margin. Order backlogs are extended 6 to 7 months for sizes over ¼-in. Earliest delivery on some of the smaller classifications is close to 12 months. Producers' production schedules continue retarded by inadequate supply of hot-rolled wire rods, notably in size range ½-in. and under. Mill deliveries have failed to record much improvement in recent months, particularly for cold-heading quality steel.

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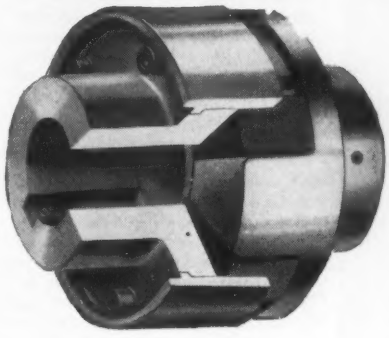

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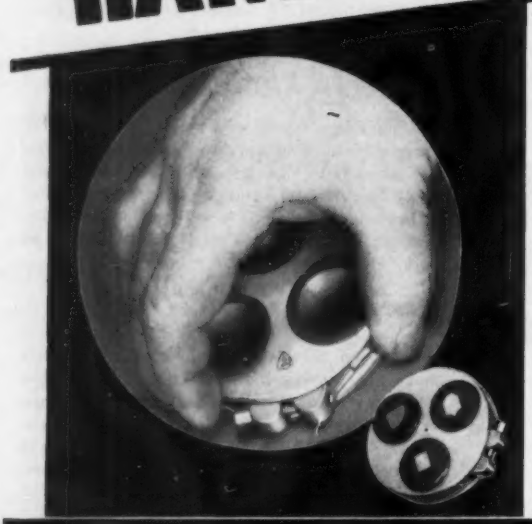

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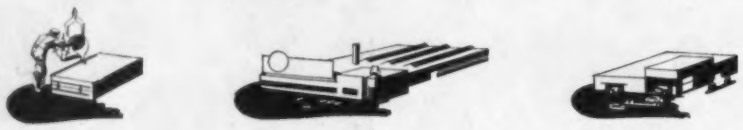


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## Refractories . . .

Refractories Prices, Page 132

**Pittsburgh** — Producers have not been able to make significant headway against order backlogs in recent weeks, reflecting exceptionally heavy demand which shows no sign of diminishing. Sellers' order backlogs are extended 6 to 8 months on special shapes, such as silica coke oven brick; although standard items for open-hearth maintenance, etc., are available within 8 to 10 weeks. Heavy demand for refractory brick is indicated for months to come, reflecting badly needed repairs for much overworked coke ovens, blast furnaces and open hearths. In addition, considerable coke oven expansion is now under way.

## Rails, Cars . . .

Track Material Prices, Page 131

**New York** — Included in recent car activity is an inquiry for 1500 freight cars and 150 cabooses for the Chesapeake & Ohio and the award of 500 fifty-ton box cars for the Delaware Lackawanna & Western to American Car & Foundry Co., New York.

## Canada . . .

**Toronto Ont.**—Iron and steel production in Canada for June fell below that of the month immediately preceding, but the daily average was larger. During June, production of pig iron totaled 159,826 net tons for a daily average of 70.8 per cent of total capacity and compares with an average of 68.7 per cent for May. The month's output included 129,861 tons of basic iron of which 120,758 tons were for further use of producing companies and 9103 tons for sale; 21,996 tons of foundry iron of which 282 tons were for further use and 21,714 tons for sale and 7969 tons of malleable iron, all for sale.

During the month under review, 11 blast furnaces were blowing and three blown out. Blast furnace charges included 305.860 tons of iron ore; 13,355 tons of mill cinder, sinter, scale, etc., and 5190 tons of scrap.

Production of ferroalloys in June totaled 16,212 net tons and included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrome and ferrophosphorus.

Steel ingots and castings produced in June amounted to 238,297 net tons or 81.7 per cent daily average, and compares with 244,076 tons for May when the daily average rate was 81 per cent. For June, output included 230,581 tons of steel ingots and 7716 tons of steel castings. Steel furnace charges were 122,988 tons of pig iron; 64,495 tons of scrap of consumers own make and 67,540 tons of purchased scrap.

Following are comparative production figures in net tons:

| | Steel Ingots | | |
|---|---|---|---|
| | Castings | Pig Iron | Ferroalloys |
| June, 1947 .. | 238,297 | 159,826 | 16,212 |
| May, 1947 .. | 244,076 | 160,230 | 15,325 |
| June, 1946 .. | 214,861 | 129,890 | 11,684 |
| 6 Mos. 1947 . | 1,483,281 | 973,153 | 77,750 |
| 6 Mos. 1946 . | 1,449,639 | 876,023 | 68,991 |
| 6 Mos. 1945 . | 1,595,618 | 941,963 | 98,672 |

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# Prospects Dim For Relief in Scrap Shortage

(*Continued from Page 47*)

time high. The next 10 days or so should throw much light on the future trend of prices.

## BUFFALO

Weaker tendencies dominate the scrap market as prices on steelmaking grades tumbled $1.50 a ton on the sale of approximately 20,000 tons to a leading mill consumer.

Several dealers participated in the aggregate sale which brought heavy melting steel and bundles down to a range of $37-38 a ton.

The easier tone spread as another mill buyer continued to hold up shipments. This mill had been receiving an influx of scrap against orders placed about $5 above the current range. With unloading facilities taxed beyond capacity, the mill held up shipments to avoid a complete rail embargo which was feared as a result of the tieup of scrap cars.

Mills are still striving to build up winter reserve stocks. Only one mill is said to have ample stocks. Another mill has about a 45-day supply. Water receipts of scrap this year are far behind a year ago. About 50,000 tons have arrived from the Duluth area via the lakes, while only 35,000 tons have come in from the seaboard via the Barge Canal.

## BIRMINGHAM

Scrap supply in this district currently is adequate and heavy melting is available at $34.50 to $35. Long range outlook, however, is not so good and the future depends largely on what happens in the northern market. If that market becomes short and scrap is shipped out of this district, another shortage and high prices are anticipated.

## BOSTON

"Scarce and poor quality" sums up the consumers' view of scrap in the New England area. Inventories are low but there is no substantial buying against winter needs. District buyers resisted the recent upsurge in prices and have relatively little scrap coming in at the peak prices.

Shipbreaking is supplying some scrap and one district steelworks is cutting down several war-built vessels.

Price variances still exist and many buyers believe prices will go lower, although the limited supply is against this. A slight increase in industrial grades is

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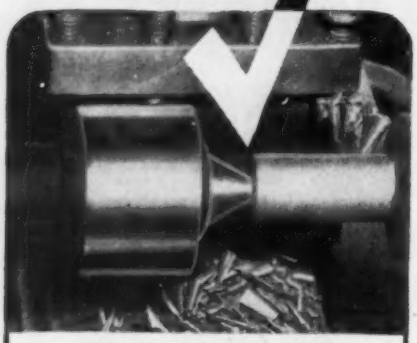

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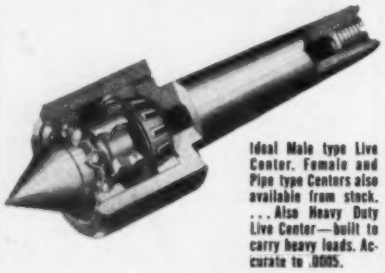

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expected in fourth quarter. Volume of automobile scrap is limited by the low rate of old car wrecking.

## CLEVELAND

Fairly general easing in scrap prices was noted in this area last week, although the test of heavy melting steel grades is yet to come. Receipts are still coming in against old contracts made at the higher prices of last month.

Cast iron grades showed an easier price trend, No. 1 cupola, for example, dropping $2 in the higher quoted limits to a spread of $43.50 to $44.00. Railroad scrap is somewhat lower priced, a 50-cent decline occurring in railroad heavy melting.

## CINCINNATI

District dealers and brokers have been aggressive in getting out scrap iron and steel with the result melters are fairly well supplied for the near term.

Dealers are moving tonnage promptly, with no substantial stocks laid down. The high rate of melt, at mills and foundries, makes their present scrap stocks appear abnormally low.

Important district interests therefore look for another pinch in scrap supplies next winter should the steelmaking rate hold at present levels which is considered almost a certainty.

Higher prices in the next few months, dealers emphasize, would have little effect on tonnage of railroad and industrial scrap which is moving steadily and without speculative holding.

## ST. LOUIS

Scrap prices and supplies have been erratic for months, with this district following by a week or two the fluctuations of eastern markets. Exact quotations have been impossible since prices during July's serious shortage depended almost wholly on the melter's individual position.

General price pattern now, on No. 1 heavy melting for example, is about $2 below the peak, with many consumers feeling a further drop is in the offing.

Some brokers say that collection sources are clean and scrap therefore will be extremely tight this winter. There are indications, however, that they really feel that as soon as farmers' and haulers' preoccupation with harvesting is over, considerably more scrap may hit the market. A current sign the usually rich farm source has not been exhausted is the improving quality of scrap reaching the steel mills since prices began to drop.

Tonnage of scrap shipments increased slightly last week, suggesting there is still metal on farms to be brought out by price fears. September usually is a good month here. Should these shipments drop sharply, however, it would


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be interpreted as a sign of winter scrap famine in the face of terrific demand. Mills are back in the market heavily now, and some have raised reserves above 30 days, stopping the adverse trend of ground stocks that prevailed when they withdrew from the market in a recent attempt to drive down prices.

## SAN FRANCISCO

Scrap supply and demand are in fair balance in the San Francisco Bay area but steel mill purchasing departments differ on predictions as to the future course of prices. One buyer expects the price to go down this fall from the present level of $22 on heavy melting and bundles. Weather conditions do not hinder collections and preparation here as in the northeast.

Another buyer believes prices may dip near the year end but expects a slight rise before then. He points out that while supply is adequate in San Francisco, the Los Angeles and Seattle districts are seriously short.

## LOS ANGELES

Southern California scrap prices are tied closely to the Chicago market since consumers here cannot take all available material. Price of $22 here for heavy melting materials means a price of $38 delivered at Chicago.

No surplus scrap exists here, despite beliefs to the contrary in the East. Outlook for the winter is bleak. No overseas material is coming in. Auto wrecking, industry and farm sources are undependable due to scarcity of new steel products. Virtually no ship scrap is originating here although some is reported in the north.

## STRUCTURAL SHAPES . . .

**STRUCTURAL STEEL PLACED**

1315 tons, beam spans for Kansas, Atchison, Topeka & Santa Fe Railroad; 1030 tons to Bethlehem Steel Co., Bethlehem, Pa., and 285 tons to Kansas City Structural Steel Co., Kansas City, Kans.

1150 tons. sheet piling, power house, Sault Ste. Marie, Mich., for U. S. Engineers, to Inland Steel Co., Chicago; Soo Constructors Inc., Winona, Minn., contractor.

1100 tons, transmission towers, Indianapolis Light & Power Co., for a line from White River generating station to Indianapolis, to American Bridge Co., Pittsburgh.

600 tons, sheet and H-piling, harbor refuge, Michigan, U. S. Engineers, Duluth, to Carnegie-Illinois Steel Corp., Pittsburgh.

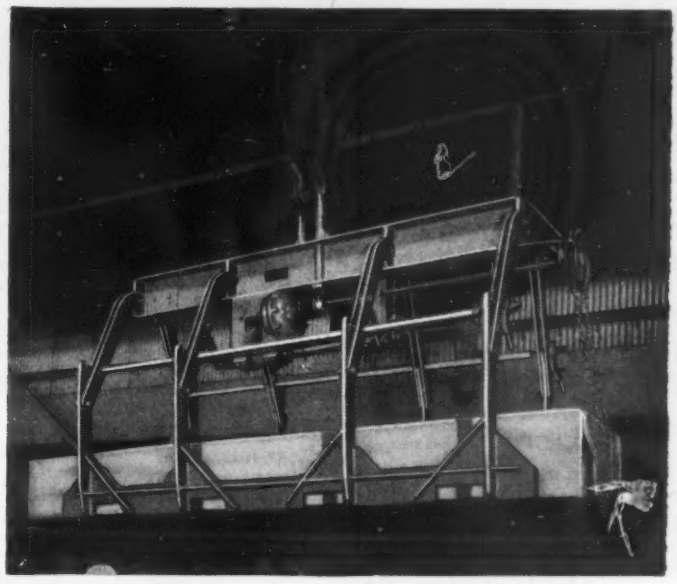
355 tons, engineering school addition, University of Buffalo, Buffalo, of which 280 tons went to R. S. McMannus Steel Construction Co., Buffalo, and 75 tons to Ernst Iron Works, Buffalo; John W. Cowper Co., Buffalo, general contractor.

450 tons, truss bridge, Northern Pacific Railroad, Thompson Falls, Mont., to American Bridge Co., Pittsburgh.

400 tons, bridge, Cont. 2834, Austin, Ind., for State Highway Commission, to Central States Bridge & Structural Co., Indianapolis; Ben Hur Construction Co., St. Louis, contractor.

175 tons, plant addition, North Carolina Pulp Co., Plymouth, N. C., to Bethlehem Fabricators, Bethlehem, Pa.

140 tons, Coca Cola Building, Lynn, Mass., to

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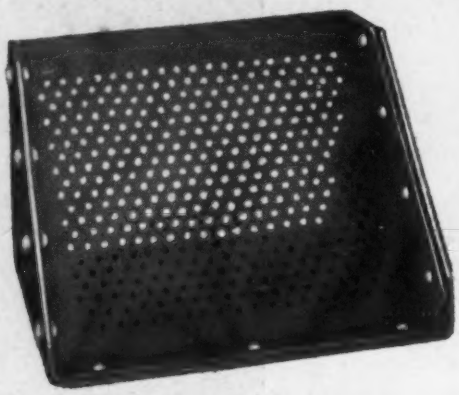

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Lehigh Structural Steel Co., Allentown, Pa.

122 tons, field house, Father Flanagan's Boys Home, Boys Town, Neb., to Gate City Iron Works, Omaha; Peter Kiewit Sons Co., Omaha, contractor.

120 tons, addition to Fisher flouring mills plant, Seattle; also 60 tons, addition to Crown-Zellerbach pulp plant, Camas, Wash., all to Pacific Car & Foundry Co., Seattle.

110 tons, Woolworth Store, Detroit, to Bethlehem Steel Co., Bethlehem, Pa.

### STRUCTURAL STEEL PENDING

2400 tons, Dupont research laboratory, Wilmington, Del., bids Sept. 12 after project had previously been withdrawn from the market.

475 tons, sheet piling, Garrison dam, Riverdale, N. D., for U. S. Engineer; bids Sept. 5.

400 tons, Dupont country clubhouse, Wilmington, Del.; bids closed Sept. 4.

250 tons, New Jersey state highway bridge, Hudson county; bids Oct. 1.

210 tons, plant extension, General Refractories Co., Baltimore; bids Sept. 9.

200 tons, foundation work, Penrose Ave. bridge, Philadelphia; bids Oct. 10. Superstructure, requiring possibly 16,000 tons, expected up for figuring in five or six months.

## REINFORCING BARS . . .

### REINFORCING BARS PLACED

2000 tons, third unit, Ross dam, Skagit power project, Seattle, to Bethlehem Pacific Steel Co., Seattle; General-Shea-Morrison, general contractors.

1800 tons, expansion of Crown-Zellerbach pulp and paper plant, Camas, Wash., to Bethlehem Pacific Steel Co., Seattle.

900 tons, bottling plant, Miller Brewing Co., Milwaukee, to Joseph T. Ryerson & Son Inc., Chicago.

400 tons, North Shore intercepting sewer, Cont. No. 6, Sanitary District of Chicago, Chicago, to Olney J. Dean Steel Co., Chicago; Paschen Contractors Inc., Chicago, contractor.

360 tons, E. 83rd St. subway substructure and superstructure, Department of Public Works, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Michael J. McDermott & Co., Chicago, contractor.

220 tons, four silos at Toppenish, Wash., for Utah-Idaho Sugar Co., to unstated interest.

110 tons, expansion, Wisconsin Telephone Co., Milwaukee, to Concrete Steel Co., Chicago.

### REINFORCING BARS PENDING

490 tons, Promontory apartment building, Chicago, for H. S. Greenwald; bids Sept. 4.

Unstated, Seattle-Tacoma Bow Lake airport administration building; estimated at $2.5 million; bids Oct. 2 to Port of Seattle.

## PIPE . . .

### CAST IRON PIPE PENDING

200 tons, project in Alaska; bids Sept. 8; Puget Sound Bridge & Dredging Co., Seattle, general contractor.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Delaware Lackawanna & Western, 500 fifty-ton box cars to American Car & Foundry Co., New York.

### RAILROAD CARS PENDING

Atlantic Coast Line has withdrawn an inquiry for approximately 4000 freight cars.

Board of Transportation, New York, 100 subway cars for interborough rapid transit; American Car & Foundry, New York, low bidder.

Chesapeake & Ohio, 1000 fifty-ton high side gondolas, 500 seventy-ton covered hopper cars and 150 thirty-ton caboose cars, bids asked.

### RAILS PENDING

Missouri Pacific, 42,285 tons of 115-lb rail and 14,065 tons of 132-lb rail, plus necessary accessories; permission to buy has been authorized by the federal court, St. Louis.

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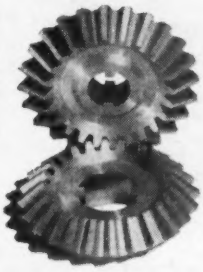
**WORM GEARS**—Made from 1" to 100" in diam. and from 24 DP to 1 DP.



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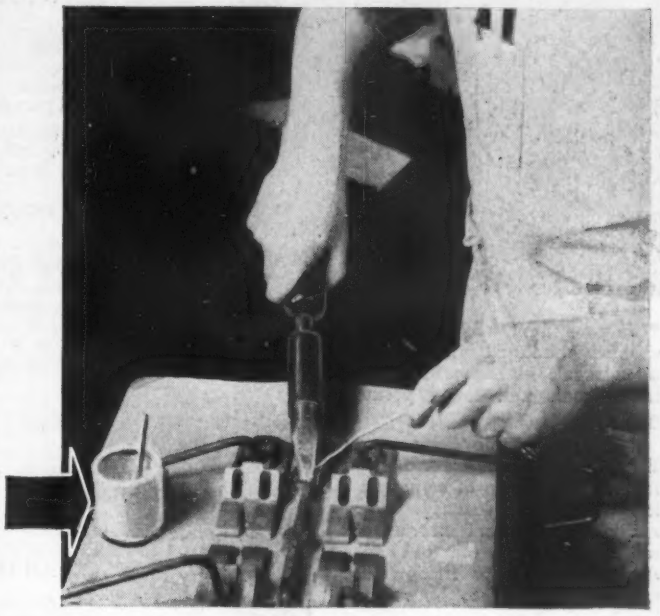

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# CONSTRUCTION AND ENTERPRISE

## ALABAMA

MONTGOMERY, ALA.—Nolin Bros. has awarded a $65,000 contract to Chastain & Co., Bell Bldg., for construction of a warehouse. Architects are Sherlock, Smith & Adams, 301 Washington St.

## GEORGIA

CHAMBLEE, GA. — Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh, is erecting a warehouse for electric lamps at 2260 Peachtree Industrial Blvd. here. Structure will provide 41,000 sq ft of floor space.

COLUMBUS, GA.—Muscogee Mfg. Co. will build a $55,000 mill addition. Architect is Rubert & Co., Bona Allen Bldg., Atlanta.

## INDIANA

VALPARAISO, IND.—McGill Mfg. Co., 259 Indiana Ave., has started construction on its $300,000 bearing division plant which is part of a general expansion program expected to require 16 to 18 months to complete. A plant addition at its electrical division and an office building are also included in the project.

## KENTUCKY

LOUISVILLE, KY.—American Printing House for Blind, 1839 Frankfort St., has awarded a $250,000 contract to J. D. Jennings Co., 35 E. Gaubbert St., to construct a printing plant addition.

## LOUISIANA

BATON ROUGE, LA.—Ethyl Corp. received a low bid of $486,750 from R. P. Farnsworth, 1515 S. Salcedo St., New Orleans, for buildings at the company's North Baton Rouge plant.

NEW ORLEANS—Lone Star Cement Corp., Hibernia Bank Bldg., will build a precipitator building.

## MARYLAND

BALTIMORE—Lever Bros. Co. has let a $250,000 contract to Stone & Webster Engineering Corp. for an extension to a finishing building at 5300 Holabird Ave. here.

BALTIMORE—Chesapeake & Potomac Telephone Co., A. B. Haneke, vice president, has let a $2,500,000 contract to Consolidated Engineering Co. for construction of an addition to its equipment building.

BALTIMORE—Noxema Chemical Co. 3100 Falls Cliff Rd., has let a $125,000 contract to Consolidated Engineering Co. Inc., 20 E. Franklin St., for construction of a plant addition. Architect is C. H. Hebrank.

BALTIMORE—Pemco Corp., Richard H. Turk, president, is completing an addition to house a smelter at 5601 Eastern Ave.

BALTIMORE—National Can Retinning Co., Russel K. Glover Jr., president, plans construction of an addition to its building at 5401 Pulaski Highway.

BALTIMORE—Comfort Spring Corp., M. J. Rymland, president, Fairmount Ave. and Bethel St., plans to erect a plant on Hollins Ferry Rd.

BALTIMORE—F. X. Hooper Co. Inc., E. A. Metz, president, is constructing a plant addition with 11,000 sq ft of floor space.

BALTIMORE—U. S. Industrial Chemicals Inc., Curtis Bay, contemplates expansion of its research facilities as part of a general expansion program which includes construction of a $1 million boiler plant now under way.

BALTIMORE—General Refractories Co., Chesapeake Ave. and Seventh St., Brooklyn, N. Y., will build a laboratory here containing 100,000 sq ft of floor area. Company is also erecting an addition to its manufacturing facilities and is just completing two projects, tunnel kilns and a plastic chrome ore building, begun a year ago.

MASONVILLE, MD.—General Steel Products Corp., 67 E. 59th St., New York, has purchased 3.6 acres of land here for a proposed plant for the manufacture of steel lockers, shelving and cabinets.

## MASSACHUSETTS

DIGHTON, MASS.—Mt. Hope Finishing Co., Spring St., has awarded a $90,000 contract to Gibane Building Co., 90 Calverly St., Providence, R. I., for a power plant renovation project to include new boilers and front walls. Engineer is M. Sampson, c/o owner.

LYNN, MASS.—General Electric Co., 920 Western Ave., will build a $112,000 factory addition. Architect is A. M. Nixon, 920 Western Ave.

MEDFORD, MASS.—General Electric Co., 920 Western Ave., Lynn, has awarded a $325,000 contract to Duffy Construction Corp., 230 Park Ave., New York, for the erection of a 1-story service plant on Mystic Valley Pkwy. Architect is J. B. Gunnison, 230 Park Ave., New York.

MEDFORD, MASS.—C. & H. Co., 60 New Cross St., Sommerville, has awarded contracts, totaling $95,000 and $64,000 respectively, to Aurther Berger, Florence St., Somerville, for the construction of a trailer assembly and repair plant and a garage addition.

## OHIO

MILLERSBURG, O.—Lydic & Hipp Drilling Co. has been formed by Ralph Hipp and William J. Lydic. Firm holds contracts for drilling gas wells for Ohio Fuel Gas Co.

## SOUTH CAROLINA

CHARLESTON, S. C.—Rubber Division of Raybestos-Manhattan Inc. has a permit for a $56,000 addition to its plant facilities here.

## TENNESSEE

CHATTANOOGA, TENN.—Columbian Iron Works has awarded a $70,000 contract to Mark K. Wilson Co., Loverman Bldg., for construction of a manufacturing plant. Architect is Selmon T. Franklin, 421 Poplar St.

## TEXAS

DALLAS, TEX.—Lone Star Gas Co., D. A. Hulcy, president, plans a $40 million expansion program during the next five years to include distribution plants, extensions to established distributing systems, purchase of new equipment, building of transmission lines, construction of compressor stations and expansion of other facilities.

FREEPORT, TEX.—Dow Chemical Co. has let a $4,500,000 contract to Tellepson Construction Co., 3900 Clay Ave., Houston, for construction of a chlorine plant, piping, foundation work and erection of equipment.

HOUSTON, TEX.—Tennessee Gas & Transmission Co., Commerce Bldg., H. Gardiner Symonds, president, has FPC authorization to construct and operate natural gas pipeline facilities to cost about $53,500,000.

HOUSTON, TEX.—Shell Pipe Line Corp. and Texas Pipe Line Co. have revealed plans for a 500-mile oil pipe line from Cushing, Okla., to Wood River, Ill. To have a capacity of 150,000 barrels a day, the line will be built at a cost of about $22 million.

HOUSTON, TEX.—Technical Instrument Co., 3732 Westheimer Rd., plans to build a $65,000 instrument building. Architects are MacKie & Kamrath, 2713 Ferndale St.

SAN ANTONIO, TEX.—Valcar Enterprise Inc., P. O. Box 5021, plans to build a $60,000 solvent extraction plant.

## WASHINGTON

SPOKANE, WASH.—Wasatch Oil & Refining Co., Salt Lake City, Utah, plans expansion and improvements in the plant of Inland Empire Refineries here, which it recently purchased for a reported $500,000.

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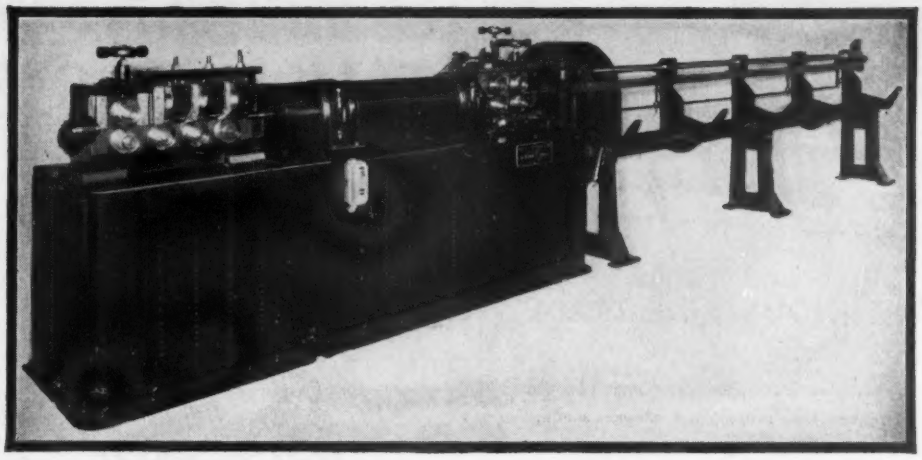
CAP.
3/16"-3/8"
DIA.
(7/16" Dia. in soft stock)



TYPE 4A
CAP.
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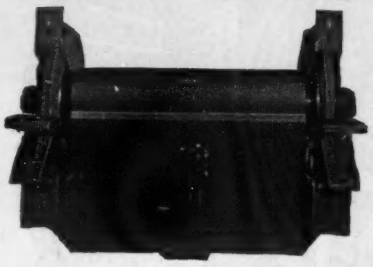

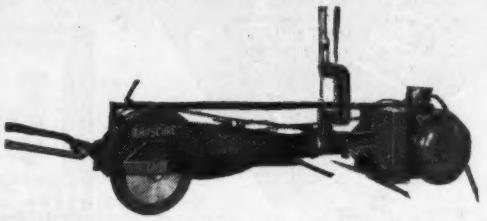

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# NEW 10-STAND FORMING & WELDING MILL FOR CONTINUOUS BUTTWELD PIPE

## *more and better pipe at less cost—*

*Out with the old . . . in with the new.*

Aetna-Standard announces another improvement in the manufacture of pipe in the continuous butt weld process. A new 10-stand forming and welding mill in place of the conventional 6-stand mill.

The 10-stand mill produces three distinct production and cost advantages:

1. **Much greater output.** Production will be as much as 50% greater on some sizes of pipe than with mills now in use. The reason—use of wider skelp, greater reduction and elongation.
2. **Higher furnace efficiency.** Use of wider skelp for the small sizes of pipe utilizes furnace capacity to better advantage. Speed through furnace need not be increased to increase production.
3. **Better quality.** It has been proven that the more work done in reducing increases quality of weld.

As in all fields, industry looks to the leader for new ideas and new developments. In continuous butt weld pipe and seamless tube, Aetna-Standard has built more mills than all other companies combined.

*The first installation of the new Aetna-Standard 10-stand continuous butt weld pipe mill is nearing completion. If you want more information on design, production, costs or other phases of this type of pipe mill, let us hear from you.*

### THE MAINTENANCE CREW CAN CHEER, TOO

1. Better guards to shield mill and adjacent parts from scale and water.
2. More accessible and improved roll adjustments.
3. All rotating shafts mounted in oil-tight casings.
4. All gears enclosed in oil-tight casings.
5. Roll spindle bearings lubricated from centralized grease system.
6. Drives lubricated from centralized oil system.
7. Individual motor drives (more flexibility in setting ratio of reduction, and longer roll life.)

DESIGNERS AND BUILDERS to the Steel, Non-Ferrous and Chemical Industries

**THE AETNA-STANDARD ENGINEERING COMPANY**
**YOUNGSTOWN, OHIO**

***ASSOCIATED COMPANY:*** HEAD WRIGHTSON & COMPANY, LTD., MIDDLESBROUGH, ENGLAND

Aetna-Standard's new 10-stand Forming and Welding Mill for Continuous Butt Weld Pipe

# Trickiest hole in golf

IT'S not the 16th at Canterbury. Nor the 10th at Augusta. It's a hole nearly every golfer is familiar with — the hole in the seamless steel tubular shaft used for most good golf clubs.

Why is this such a tricky hole to make? Because the walls of the shaft must be paper thin... yet extremely precise in dimensions and physical properties in order to insure uniform performance of all clubs in the set.

The makers of True Temper golf shafts weren't satisfied they had achieved the ultimate. They wanted a better shaft, yet with no substantial increase in cost. So they turned to metallurgists of The Timken Roller Bearing Company.

Timken produced the answer. First, by developing a special new alloy steel with higher tensile and impact strength. Second, by converting this steel into flawless seamless tubing. Tubing free from pits and scratches. Uniform in wall strength and thickness. Highly concentric. And with uniform response to cold drawing, heat treating and finishing—the steps by which the tubing supplied by Timken is fabricated into finished golf shafts in the maker's plants.

Through years of specialization, Timken metallurgists have built a background of experience and research in alloy steels that is unique in the industry. That's why you'll find that so many tough jobs can be stamped: "Solved — by Timken Alloy Steel"! It's a record no other steel producer can equal.

We'd like to tackle *your* tough problems, too. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio. Tapered Roller Bearings, Alloy Steels and Seamless Tubing, Removable Rock Bits.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN
Fine Alloy
STEEL
and Seamless Tubes

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